

**BIOREMEDIATION AND SOIL FLUSHING
TREATABILITY STUDY REPORT
L. E. CARPENTER AND CO.
PART 1 OF 2**

**PREPARED FOR
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**PREPARED BY
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1.0 Introduction

L.E. Carpenter and Company (Carpenter) requested laboratory treatability testing in support of a Feasibility Study for a Superfund site in Wharton, New Jersey. From 1943 to 1987, the site housed a production facility for the manufacture of vinyl wall coverings. Between 1963 and 1970, polyvinyl chloride sludge was disposed of in a surface impoundment. Additionally, the site contained numerous support facilities including underground storage tanks, an above ground tank farm, various process waste tanks, cooling water equipment, and other processing equipment.

The primary contaminants on site are:

- Bis(2-ethyl hexyl)phthalate (DEHP)
- Xylenes
- Lubricating oil
- Ethyl benzene
- Naphtha

Approximately 5,000 gallons of water immiscible material consisting of these compounds have been pumped from the site subsurface since 1984. Primary contaminants in soil and groundwater are phthalates, polynuclear aromatic hydrocarbons, ethyl benzene, and xylenes.

IT Corporation (IT) conducted the described bioremediation and soil flushing treatability studies for the L.E. Carpenter site under a subcontract from Roy F. Weston, Inc. (WESTON).

2.0 Remedial Technology Description

2.1 Bioremediation

Bioremediation of the site could employ both in situ and ex situ treatment strategies. In situ bioremediation has been successfully applied to the remediation of contaminated aquifers impacted with hydrocarbons such as benzene, ethyl benzene, lubricating oils, and xylenes. Microorganisms indigenous to the subsurface are most commonly used for the remediation. In practice, mechanisms for the introduction of oxygen and nutrients and control of pH are employed to enhance the subsurface environment to stimulate biological activity. A variety of engineering designs may be employed to ensure proper control of environmental parameters.

Ex situ bioremediation of groundwater would employ a bioreactor. A fixed film reactor was suggested in the Request for Proposal (RFP) as the reactor operating mode. The present scope of work, however, describes batch studies to determine the potential for successful biodegradation of DEHP and other hydrocarbons in groundwater.

2.2 Soil Flushing

Soil flushing is an in situ treatment process that incorporates the infiltration and percolation of water through a soil profile to mobilize chemical constituents within the soil and transport them to areas for accumulation and ultimate collection. The process consists of applying an aqueous solution to an unexcavated soil either through surface applications, such as flooding or sprinklers, or through injection. A series of shallow well points or subsurface drains are then used to collect the flushing solution containing contaminants and return it to the surface for subsequent treatment or disposal. Following treatment, the groundwater can be reinjected, discharged, or applied upgradient of the extraction wells for continued flushing of the soil.

The movement of an aqueous solution through the soil mobilizes chemical constituents through mass action and chemical reaction mechanisms. Aqueous flushing solutions may be amended with selected reagents to enhance chemical solubility, resulting in increased mobility and therefore increased recovery of chemicals in the leachate or groundwater. The addition of surfactants (e.g., anionic, nonionic, cationic, or amphoteric) is one method for amending aqueous flushing solutions used in treating soils contaminated with organic chemicals.

3.0 Conclusions and Recommendations

3.1 Initial Characterization

The treatability study determined that bioremediation has the potential to biodegrade the target compounds, ethyl benzene, xylene, and DEHP. Native microbes possess the necessary metabolic capability to degrade ethyl benzene, xylene, and DEHP. The biodegradation of these compounds was demonstrated in bench-scale batch studies; however, biodegradation has not been determined under in situ conditions where complex interactions among water, soil, ions, organic compounds, and microbes exist. The preliminary evaluation of site characteristics indicated that the site is acceptable for in situ biological treatment.

The following conclusions were drawn from the initial analytical characterization of site samples:

- A relatively large microbial population was detected within the impacted aquifer.
- In most cases, microorganisms present in the groundwater and soil responded very positively to nutrient and oxygen stimulation.
- The site soil had moderate to high phosphate levels and moderate to very low ammonium content. Nutrient addition will be required to enhance the biodegradation process as indicated by the nutrient stimulation test.
- Nutrient compatibility was excellent. The recommended nutrient concentration for injection into the aquifer is 10,000 mg of Restore® 375 per liter.
- Nutrient adsorption by site soil was high on the first addition of nutrients; however, subsequent nutrient additions resulted in progressively lower adsorption. Nutrient adsorption should not seriously interfere with nutrient transport after the first few batch additions.
- The efficiency of oxygen delivery using hydrogen peroxide will be acceptable.
- With one exception, the pH of all soil samples was within the preferred range for successful bioremediation. The pH of the groundwater was within the preferred range. Initial adjustment of the pH is not recommended; however, periodic monitoring should be performed to ensure that drastic changes in pH do not occur.

3.2 Groundwater Biotreatability Study

The groundwater biotreatability study indicated efficient biological removal of target compounds using indigenous microorganisms. Groundwater batch treatment results are summarized below:

- Greater than 99.9 percent of the ethyl benzene was removed from all biologically active treatments within 43 hours. Greater than 99.9 percent of the xylene was removed from the activated sludge treatment within 43 hours. Xylene removal from the two biologically active groundwater treatments proceeded at a slower rate compared to the sludge-amended treatment with approximately 50 percent removed after 43 hours. Xylene was nondetectable ($<6.6 \mu\text{g/L}$) in all biologically active treatments after 183 hours. Appreciable loss of ethyl benzene (approx. 80 percent) and xylene (approx. 75 percent) was observed in the abiotic control. This loss was attributed to volatilization.
- DEHP was biodegraded with a half-life of approximately 60 to 70 hours in the treatments containing site microbes. DEHP removal efficiency was 99.7 percent. Activated sludge was much less efficient in DEHP biodegradation with a calculated DEHP half-life of 176 hours and a removal efficiency of 86 percent. Virtually no DEHP was lost from the abiotic control.
- No microbial toxicity was observed during the study.
- Microbial enumerations, volatile solids content, and target compound loss generally indicate that the addition of microbes to the groundwater does not provide a long-term benefit.
- No appreciable changes in nutrient concentration occurred during treatment.
- The pH of groundwater treatments containing native microbes increased slightly whereas the pH of the activated sludge augmented treatment became more acidic during treatment.

3.3 Soil Flushing Treatability Study

The treatability study determined that soil flushing with surfactant-amended flushing solutions has a greater potential to remove DEHP from soil than just the use of potable water. The study also indicated that the type of surfactant may play a vital role in determining the leaching efficiency of DEHP from soil. In this study, a 0.5 percent Brij 30/35 flushing solution was much more effective than a 0.5 percent Tween 85 solution in removing DEHP from soil.

The following conclusions were drawn from the soil flushing treatability study:

- Geotechnical characterization of site soils indicate that the hydraulic conductivity of these soils is high enough to support an in situ remedial process such as soil flushing.
- The plasticity index of these soils indicates that the low cohesive qualities of site soils would allow for long term soil flushing with minimum potential for decreases in hydraulic conductivity during the remedial process.
- VOCs were readily removed from soil under bench-scale conditions using only potable water and a high percentage of these analytes were removed during the initial stages of soil flushing.
- Phthalates were not responsive to soil flushing using just potable water.

- The use of surfactants to amend the flushing solution increases the amount of phthalates removed in the leachate.
- The type of surfactant used in the flushing solution is a critical factor relative to the efficiency with which phthalates are removed from soil.
- The percent of DEHP removed from soil can be relatively high, even when high concentrations of the compound are initially present within the soil.

3.4 Recommendations

The results of laboratory treatability studies indicate that both soil flushing and bioremediation have potential benefits for site remediation. In situ aquifer bioremediation is technically feasible and should continue to be considered as a candidate for treatment of this site. Hydraulic control of the contaminant plume and the development of a groundwater injection and recovery system that will permit treatment of the plume is critical for successful in situ aquifer bioremediation. An above ground bioreactor may be a viable technology to remove residual organics from recovered groundwater. Site microbes were shown to be effective in biodegrading ethyl benzene, xylene, and DEHP.

Soil flushing with water was effective in removing VOCs; however, water alone was ineffective for flushing DEHP. A surfactant-amended flushing solution was effective in removing DEHP from soil. Soil flushing, particularly with surfactant amended solutions, may be an effective technology for reducing the concentration of VOCs and DEHP in the soil.

A combination of soil flushing and bioremediation may provide an efficient treatment strategy for remediating the subsurface. Surfactant usage must be carefully controlled because many surfactants are biodegradable and, thus, they represent a significant oxygen demand. They may also be preferentially biodegraded leading to reduced efficiency in target compound removal.

4.0 Treatability Study Approach

4.1 Test Objectives and Rationale

The treatability study evaluated the potential applicability of bioremediation and soil flushing as remedial technologies for contaminant removal from groundwater and soils at the Carpenter site. The primary focus of the remedy screening tests was to evaluate the efficacy of these two technologies on the removal of designated target compounds. Chemical constituents targeted for monitoring throughout these remedy screening studies were DEHP, xylene, and ethyl benzene. The amount of each targeted chemical constituent removed, relative to the initial amounts in groundwater and soil, was used to evaluate the effectiveness of the technologies. The main goals of the study were (1) to show the effectiveness of the treatment strategies in reducing the concentrations of target compounds, and (2) to provide design information required for the next level of testing.

4.2 Experimental Design and Procedures

The experimental design provided data for evaluating changing concentrations of target compounds, microbes, nutrients, and pH (Tables 1 and 2). Each treatment scheme was run in triplicate to permit statistical comparison of each treatment's performance.

For respirometric studies of compound biodegradation, oxygen consumption was monitored for the duration of the study. The total mass of carbon dioxide produced during the study was determined at the end of the study by measuring the inorganic carbon content of a potassium hydroxide (KOH) trapping solution in each respirometer vessel.

Biologically-inhibited controls treated with mercuric chloride were used to determine compound loss due to physical processes such as volatilization and adsorption to the reaction vessel. A zero headspace untreated control was established to quantify the loss of target compounds and residual nutrients and the change in microbial density and pH in a completely untreated control. The experimental design accommodates conservation of the mass balance within each treatment vessel and provides for evaluating losses by biological and physical mechanisms.

Reduction in target compound concentration at the end of the study was evaluated using single classification Model I analysis of variance (ANOVA) (Sokal, R. R. and F. J. Rohlf, 1981, *Biometry: The Principles and Practice of Statistics in Biological Research*, 2nd Edition, W. H. Freeman and Co., San Francisco). The mean residual concentrations of ethyl benzene, xylene, and DEHP were compared for each treatment to determine if a significant difference at the 95 percent confidence level could be attributed to treatment. The null hypothesis states that there is no difference among means of the various treatments. Additionally, planned comparisons were

conducted using the F-test to determine if significant differences at the 95% confidence limit existed between treatments.

4.3 Equipment, Materials, and Methods

All treatments to be evaluated for target compound biodegradation or physical removal were conducted in clean glass vessels or Teflon-lined containers. Abiotic controls were established and treated exactly like biologically active controls to quantify abiotic loss of target compounds.

4.3.1 Biotreatability Equipment and Materials

DEHP, xylenes, and ethyl benzene were analyzed using gas chromatography (GC). Methods were developed for rapid screening of the biotreatability study performance. Split samples, taken at initial and final time points, were submitted to a contract laboratory for analysis by standard procedures, US EPA Method 8240 for volatile organic compounds and US EPA Method 8270 for semivolatiles, to verify initial, intermediate, and final analyses accomplished using rapid turnaround screening procedures.

The total organic carbon (TOC) content of all aqueous treatments was determined using a Dohrmann Total Carbon Analyzer. The pH of treatments was determined using Orion pH electrodes. The nitrogen, as ammonia, and phosphate content of each treatment was determined using modified Standard Method 4500-NH₃ F and 4500-P E, respectively (Standard Methods for the Examination of Water and Wastewater, 17th edition). Microbial respiration was quantified using computerized respirometers (N-Con Systems, Larchmont, New York).

4.3.2 Soil Flushing Equipment and Materials

Soil samples were flushed using a flexible wall permeameter and modified control system as described in Section 4.3.2.1.

4.3.2.1 Bench-Scale Studies Using a Flexible Wall Permeameter

Bench-scale soil flushing studies are necessary to determine the applicability of a particular site's soil to in situ remediation and to design a soil flushing treatment system. Column studies are the primary method for determining the leachability of chemical constituents from a particular soil. To overcome the adverse effects of a rigid wall column system, a flexible wall permeameter was adapted from geotechnical soil testing and incorporated into a bench-scale soil flushing treatability system.

Undisturbed soil samples collected in the field are used intact in the soil flushing treatability study. Careful consideration is given to establish the flow rate for a specific soil-chemical matrix. Residence time of the flushing solution in the sample is a critical factor in determining the removal efficiency of chemical constituents from the soil. Equilibrium conditions between the chemicals

bound to the soil and their concentrations in the flushing solution are dependent on this residence time as well as solubility and dissolution constants for each chemical. Field-time conditions can be accelerated in the long-term soil flushing study, often to the extent that several decades of fluid flow can be predicted in only a few months of laboratory testing. This task is accomplished by permeating fluids through the sample under higher pressure gradients and greater flow rates than would typically occur in the field environment.

The volume of solution passed through a sample during the study is described in terms of the number of pore volumes flushed through the soil sample per unit of time. The pore volume is easily determined for each sample prior to initiation of flushing studies. Expressing chemical removal on a pore volume basis permits extrapolation of bench-scale data to real-time site estimations for remediation.

4.3.2.2 System Design

Figures 1 and 2 illustrate the bench-scale soil flushing treatability test system. The system included a control panel, peristaltic pump, flushing solution feed reservoirs, flexible wall permeameter cells, digital transducer, sample collection reservoirs, resin traps, and a refrigerated leachate collection cabinet. The control panel was used to regulate and monitor cell water and the confining hydraulic pressure exerted on individual soil samples contained within each cell. Separate pressure regulators control the confining cell pressure while cell water volume is monitored by individual burettes. Cell water volume was monitored to ensure that cell water did not enter the sample and contribute to the volume of flushing solution.

The soil flushing solution was supplied to individual cells from separate glass reservoirs. Flow rates were adjusted to deliver approximately five to ten pore volumes per 24-hour flushing period and simultaneously provide sufficient quantities of leachate per collection period for the required analyses. The flushing solution entered the bottom of the cell through the pedestal, was distributed across the width of the sample, and moved in an upward direction through the soil sample. The sample, wrapped in Teflon® and encased in a latex membrane, was confined within the cell by an external pressure applied to the cell water. The flushing solution flowed directly through the sample with minimal movement along the sample/confining wall interface. This flow pattern also minimized any internal channelling of the flushing solution as it moved through the soil.

As the flushing solution started to move up through the sample, air was displaced from the pores and replaced with solution. This resulted in a nearly saturated sample throughout the course of the flushing study. The flushing solution exited the sample through the top cap and flowed via Teflon tubing to the refrigerated leachate collection bottles. Each glass collection bottle was equipped with three Teflon® fittings that allowed leachate entry, leachate overflow to additional collection bottles, and venting of headspace gases through Tenax® resin columns to the atmosphere.

Each permeameter cell was equipped with inlet/outlet monitoring valves in line with a digital pressure transducer. Because flow rate was controlled by a pump, these valves allowed for the head and back pressure for each sample to be monitored constantly throughout the soil flushing study. This feature continuous monitoring of the hydraulic conductivity of each sample during the entire soil flushing study. Each cell was also equipped with sampling ports in line with the inlet and outlet valves. Samples of the flushing solution could be collected as the solution entered and exited the soil sample, at any time during the operation of the flushing study. This feature was used to monitor dissolved oxygen concentration of the soil flushing solution, allowing for an estimation of the level of microbial activity during the flushing study.

4.4 Sampling and Analysis

4.4.1 Experimental Design

Shelby tube samples collected in the field were shipped and stored at 4°C until used in the soil flushing study. Intact soil samples were extruded from the polyethylene liner and trimmed to an approximate size of 7.1-centimeter (cm) diameter by 12-cm length. Representative samples of each soil were analyzed for an initial estimate of the concentration of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) expected in the actual samples used in the flushing study, as described in Section 4.4.3.4.

The diameter, height, weight, and moisture content were determined for each of the four intact soil samples collected from the site. Specific geotechnical characteristics were calculated from these measurements. Samples were wrapped in Teflon tape and confined in a latex membrane. A filter paper (Whatman No. 42), followed by a porous stone, was attached to each end of the sample. All sample handling was performed in a walk-in cooler at 4°C.

Each sample was placed inside the plexiglass permeameter cell and attached to the pedestal and top cap. All cells were filled with water and a confining pressure was applied to the cell. Each cell was maintained at ambient temperature. The flushing solution was pumped through 1.5 millimeter (mm) PharmMed™ tubing to deliver a flow rate of 0.5 milliliter per minute (mL/min) or approximately 5 to 10 pore volumes per 24 hours.

The soil flushing study was maintained for an equivalent 10-year leachate collection period compressed to 60 days. Tenax resin columns were used to collect volatile organics from the headspace of the leachate collection bottles. Leachate samples were collected and stored at 4°C until analyzed. Accumulated leachate was collected for each of the three flushing periods. Three sample analysis periods (TS₀, TS₁, and TS_{final}) were conducted at the beginning, middle, and end of the soil flushing cycle. Total leachates were analyzed for VOCs (U.S. EPA Method 8240 - gas chromatography/mass spectroscopy [GC/MS]) and SVOCs (U.S. EPA Method 8270 - GC/MS).

Hydraulic conductivity was determined for all samples. The flexible wall permeameter system is designed to allow for monitoring hydraulic conductivity during the course of the soil flushing study. Measurements were taken at specific time intervals throughout the soil flushing treatment in order to monitor fluctuations in hydraulic conductivity during the study.

4.4.2 Collection of Site Samples

4.4.2.1 Sample Locations and Collection

Field samples were collected by WESTON using the IT Biotechnology Applications Center (BAC) standard operating procedure for collection and shipping of biological samples. Samples for preliminary analytical screening were submitted directly to IT Analytical Services (ITAS). A report from WESTON describing the locations and depths of the field samples is attached (Appendix A).

4.4.2.2 Groundwater Sampling

Three well locations were selected with respect to the hydrology of the site, an upgradient, downgradient, and source area. These wells have been reported to provide a representative sampling of the full range of VOCs and SVOCs concentrations. VOCs range from nondetectable to 136,000 µg/L. SVOCs were reported to range from nondetectable to 67,898 µg/L.

4.4.2.3 Soil Sampling

Three soil sampling locations were selected based on their proximity to previous test pit sampling locations. These sampling locations with documented contaminant concentrations (Remedial Investigation Report) are considered representative of a range in soil contaminant levels (low, medium, and high). Test pits in the area with high levels of contaminants were reported to have concentrations of DEHP and total targeted volatiles ranging from 3,100 to 30,000 mg/kg and 0.2 to 532 mg/kg, respectively.

4.4.3 Sampling and Analysis During Treatment

4.4.3.1 Groundwater Analyses

Initial Analyses. Groundwater samples provided by Carpenter underwent the following analytical testing:

Total solids	U.S. EPA Method 160.3
Total suspended solids	U.S. EPA Method 160.2
Total dissolved solids	U.S. EPA Method 160.1
Conductivity	U.S. EPA Method 120.1
Acidity	U.S. EPA Method 305.1
Alkalinity	U.S. EPA Method 310.1

pH	U.S. EPA Method 150.1
Total Kjeldahl nitrogen	U.S. EPA Method 351.1
Ammoniacal nitrogen	U.S. EPA Method 350
Phosphate	U.S. EPA Method 365
Biological oxygen demand (5-day) (BOD ₅)	U.S. EPA Method 405.1
Chemical oxygen demand (COD)	U.S. EPA Method 410.1
Total metals	U.S. EPA Method 200.7

Additional Analyses. In addition to the aforementioned tests, the following tests were also conducted on groundwater and saturated zone soil samples:

Microbial Enumerations	Modified Spread Plate Method
Microbial Stimulation Testing	IT Standard Operating Procedure
Minerals Analysis	IT Standard Operating Procedure
Nutrient Compatibility	IT Standard Operating Procedure
Nutrient Adsorption	IT Standard Operating Procedure
Total Organic Carbon	Modified U.S. EPA Method 415
Oxygen Delivery Potential	IT Standard Operating Procedure

These tests provide additional information that is valuable in determining those physical, chemical, and microbiological properties that impact successful bioremediation. A brief description of each test is provided:

- Microbial enumerations are used to determine the population density of total bacteria and contaminant-degrading bacteria.
- Microbial stimulation testing is used to determine if the native bacterial population will respond favorably to oxygen and nutrient augmentation.
- Mineral analysis determines the calcium, magnesium, and iron content of site groundwater. These elements impact the efficiency of nutrient and oxygen transport.
- Nutrient compatibility examines the interaction of nutrients with groundwater and determines the proper nutrient addition rate.
- Nutrient adsorption evaluates the binding affinity of nutrients to aquifer materials. This relates to nutrient transport efficiency.
- TOC determinations provide insight on the ultimate mass of organic material that may be available for biodegradation in groundwater. This impacts the overall nutrient and oxygen requirements for the treatment system.
- Oxygen delivery potential determines the potential for efficient oxygen delivery through an aquifer using hydrogen peroxide.

4.4.3.2 Microbial Inhibition Testing

The previously described microbial stimulation test will be used as a direct indicator of the inhibition of microbial activity by site samples. Microbial stimulation testing determines the response of native bacteria to nutrient and oxygen amendments. The response of microbes to this test is measured by increase in cell density. If the groundwater or soil contains toxic materials or is in some way inhibitory to microbial activity, the indigenous microbial population density fails to increase or is reduced. The microbial stimulation test should be independently conducted on groundwater and soil samples because many organic contaminants are found in higher concentrations in the soil. Analyzing only groundwater may give misleading results regarding the toxicity of the subsurface environment to microorganisms.

4.4.3.3 Batch Biodegradation Studies

Batch biodegradation studies were performed on site groundwater samples. The studies were conducted in computerized respirometers, which measure oxygen consumption by microorganisms and replace the oxygen to avoid oxygen limitations. This approach for monitoring microbial activity is not disruptive to the sample vessel and is not labor intensive.

Respirometric analysis of microbial activity provided a real-time indication of contaminant biodegradation. Using this approach, sampling points were chosen based on microbial activity rather than on an arbitrary time schedule. Also, because the vessels were sealed and remain sealed for most of the study, the loss of volatile organics was minimized.

A total of 15 treatment vessels were established. The treatment scheme is described in Table 1. Each treatment was conducted in triplicate. This experimental design demonstrated the biodegradation of target compounds in contrast to untreated and biologically inhibited controls. In addition to using indigenous microorganisms, the benefit of augmenting groundwater with activated municipal sludge and microorganisms isolated from site soil samples and grown on DEHP was evaluated. The use of alternative sources of microorganisms provided a means to increase the overall microbial density and diversity compared to groundwater alone. Activated sludge was collected from a local publicly owned treatment works (POTW) in Knoxville, Tennessee and a washing program was completed to deplete the residual dissolved carbon in the sludge. To ensure that each treatment contained the same initial concentration of target compounds, soil microorganisms were extracted from the soil and added to appropriate treatments in a minimal volume of contaminant-free buffer solution. Biological solids were added to a final solids density of 860 mg/L.

A single groundwater composite (18-L) was prepared from which all treatments were established. Triplicate analyses were performed on this composite. The composite groundwater sample was found to have a very low concentration of ethyl benzene, xylene, and DEHP; therefore, 3 mL of a

solution consisting of 1 part ethyl benzene, 1 part ortho-xylene, and 1 part DEHP was added to the 18-L composite sample and thoroughly mixed with the water to aid dissolution. An equal mass of water was removed from the bottom of the composite sample container and placed in each respirometer vessel. Nutrients and alternative microorganisms were added to appropriate treatments. Biologically-inhibited controls were treated with mercuric chloride. The untreated controls were placed in zero headspace vessels with no nutrient or microorganisms added and incubated in the dark at room temperature for the duration of the study. The remaining vessels were connected to the respirometer, maintained at constant temperature in the dark, and stirred continuously using a magnetic stir bar.

Oxygen consumption was continuously measured and recorded every 2 hours. Carbon dioxide production, pH, residual nutrients, and microbial density were determined at the end of the study. Contaminant and total organic carbon analyses were performed initially on the composite sample, on each vessel twice during the study as indicated by microbial respiration, and at the end of the study. The analytical scheme for the study is presented in Table 2. The study was terminated when microbial respiration became asymptotic.

4.4.3.4 Soil Testing

Microbial Enumeration Testing. The density of heterotrophic and contaminant-degrading microorganisms was determined for soils used in the treatability studies. Although this phase of the study was in support of the biodegradation studies, it was also designed to support soil flushing results. The impact of biodegradation on the overall removal of contaminant mass was considered because this may significantly enhance the efficacy of soil remediation. Therefore, in support of the biodegradation studies, each soil sample was tested for pH, residual nutrients, and microbial stimulation as described in Section 4.2. Microbial population size and pH were also determined on representative aliquots of all four soils used in the soil flushing study prior to the initiation of flushing.

Initial Analytical Analyses. Samples received at the BAC from WESTON represent a range in contaminant levels for soils at the Carpenter site, as described in the sampling plan (Appendix A). To evaluate the efficacy of soil flushing as a potential remedial technology for site soils, soils with the highest concentration of contaminants were selected for use in the study. To determine the samples to be flushed, an initial analysis for DEHP from selected samples was conducted prior to initiating the study.

Aliquots of soil were selected from Shelby tubes retrieved from locations with reported high and medium concentrations of target compounds. Soil was equilibrated with an extraction solvent at a 1 to 5 (weight to volume) ratio for 12 to 18 hours. This slurry was extracted using sonication for 10 minutes prior to centrifugation. The supernatant was collected, concentrated, and analyzed for

DEHP using GC. Results from this initial screening were used to select the four samples used in the soil flushing treatability study.

Representative soil samples were collected from soil adjacent to each of the actual intact soil samples used in the soil flushing study. Soil could not be removed from the actual intact sample used in the flushing study. These analyses were, therefore, an initial estimate of the concentrations of VOCs and SVOCs for the intact samples used in the flushing study. Initial analyses included the following:

- VOCs
- SVOCs
- pH
- Water content.

Initial soil analysis data for mass balancing the soil flushing system could not be used. These soils were not chemically identical and therefore variability in the level of individual chemicals could be significant. Even soil within an intact sample will not be homogeneous with respect to the concentration of chemicals; therefore, all mass balancing efforts for VOCs and SVOCs within the soil flushing system were derived by back-calculating (the summing of chemical constituents in the leachates, final soil, and resin columns).

The flushing solution was potable water. The pH of the water was adjusted to match that of the site groundwater. The flushing solution was analyzed for the following:

- pH
- Specific conductance
- COD
- VOCs
- SVOCs.

4.4.3.5 Geotechnical Analyses

Geotechnical characterization of soils was determined on samples retrieved from the Carpenter site. Multiple depths for each of the three locations were sampled and, therefore, should provide some representative spatial distribution of the physical characteristics for the site.

To assess the range of characteristics that may be encountered at the site, selected representative samples were analyzed for the following geotechnical characteristics:

- Water content
- Particle size distribution
- Organic carbon content
- Atterberg limits
- Bulk density

- Specific gravity
- Hydraulic conductivity.

Samples were analyzed for the above-listed characteristics. Selection of soil samples for geotechnical testing depended on a number of factors including visual observation of each sample, the zones or horizons represented by each of the sampling depths, and the site locations for each set of samples or sample depths.

4.4.3.6 Soil Flushing Studies

The procedure followed for the soil flushing study is a modified version of hydraulic conductivity test methods for soils: U.S. EPA 9100, Saturated Hydraulic Conductivity, Saturated Leachate Conductivity, and Intrinsic Permeability; American Society for Testing and Materials (ASTM) D 5084-90, Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter; and U.S. Army Corps of Engineers EM 1110, Appendix VII: Permeability Tests. The procedure incorporates the use of a flexible wall permeameter (Figure 1) for conducting bench-scale soil flushing treatability studies on intact soil samples.

The flexible wall permeameter is a plexiglass cell designed to house an intact soil sample of a specific diameter and height. The sample, placed between a stainless steel pedestal and top cap, is encased in an inert material, confined in a latex membrane, and placed inside the cell. The cell is filled with water and a confining pressure applied. The sample is isolated from the cell water except for the confining pressure exerted on the sample. The pedestal and top cap are plumbed with Teflon® tubing to stainless steel inlet and outlet ports on the outside of the cell, allowing for flushing solution to enter and leachate to exit the sample.

4.5 Data Management

IT is committed to providing services for hazardous and toxic materials management that meet the technical and economic needs of our clients, satisfy regulatory requirements, and are commensurate with current state of the art. To provide direction for corporate operations so that they are performed in a controlled manner that can be demonstrated, IT has developed and implemented a formal Quality Assurance (QA) Program. This program, established in 1973, operates in compliance with the Code of Federal Regulations, 10 CFR 50, Appendix B; American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities"; and current U.S. EPA guidelines and recommendations (e.g., QAMS-005/80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans"). This program establishes policies to facilitate the implementation of regulatory requirements and to provide internal means for control and review that ensure the work performed by IT complies with all requirements.

Site-specific QA/quality control (QC) procedures will be in accordance with the following documents:

- IT Engineering Operations QA Manual, Revision 1, July 1, 1987 and IT Analytical Services QA Manual, Revision 1, February 1, 1988.
- U.S. EPA, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," QAMA-005/80.
- IT Analytical Services QA Manual, Revision 1, February 1, 1988.

4.5.1 Data Acquisition

Measuring and test equipment used in the field or laboratory was subject to a formal calibration program as described in Section 5.5, Equipment Calibration and Control, of the Environmental Projects Group Engineering Operations QA Manual. Calibration of laboratory equipment was documented in the project-specific laboratory notebook. Equipment that failed calibration was taken out of service and a Notice of Equipment Calibration Failure record was completed or the instrument was adjusted to permit correct operation. Records of equipment calibration are maintained in the project file located in Knoxville, Tennessee.

Sampling of all aspects of the treatability study was conducted by IT personnel. Sampling was performed in accordance with Section 5.0, Data Acquisition, of the Environmental Projects Group Engineering Operations QA Manual. Field samples were collected by WESTON personnel using IT Standard Operating Procedures for collection of microbiological samples and the IT Chain-of-Custody/Request for Analysis form.

All analyses were performed by either ITAS or the IT BAC laboratory in Knoxville, Tennessee. The methods used are listed in Table 3. QA/QC procedures prescribed in the U.S. EPA methods were used in all analyses. During the treatability study, total solids, total suspended solids, total dissolved solids, pH, ammoniacal nitrogen, ortho-phosphate, microbial enumerations, total organic carbon, and quantification of target compounds were performed by the IT BAC. Standard operating procedures and QA/QC requirements were followed. Records of all analyses were recorded in a bound laboratory notebook dedicated solely to this investigation.

4.5.2 Data Reduction, Validation, and Reporting

Data reduction, validation, and reporting were in accordance with the requirements contained in the following:

- IT Engineering Operations QA Manual, Revision 1, July 1, 1987, Modeling and Design.

- IT Analytical Services QA Manual, Revision 1, February 1, 1988, Section 10.0, Data Verification.

Numerical analysis was performed in accordance with the implementation methods described in the aforementioned documents, as amplified or modified by the following discussion of numerical/analysis activities of particular significance.

To provide evidence of satisfactory work performance and the basis for information transmitted to the U.S. EPA, numerical analysis and results were documented. Documentation may include calculations, computer programs, and associated input/output, logs, drawings, and tables. Analysis activities will be performed in a planned and controlled manner. Where appropriate, documented and approved work instructions were employed.

Calculations are legible and in a form suitable for reproduction, filing, and retrieval. Documentation is such that a technically qualified individual can review and understand the calculations and verify the results. Calculations were performed on standard calculation paper or laboratory notebooks whenever possible. Data validation was performed in accordance with the IT QA Manual, Section 6.2.1, Calculations.

IT drawings were signed and dated by the draftsperson performing the work and the project manager who has checked the drawing. Revisions were noted on the drawing original with a revision number and brief note describing each revision. The note was signed and dated by the draftsperson performing the work and the project manager who has checked the revision.

Data are reported in tabular form as part of the overall project report. Validation of the report data complies with the IT Engineering Operations QA Manual, Section 9.0, Report Preparation.

4.5.3 Internal QC Checks

QA audits and surveillances are performed in accordance with the requirements contained in the following:

- IT Engineering Operations Quality Assurance Manual, Revision 1, July 6, 1990. Section 11.0, Quality Assurance Audits.
- IT Analytical Services Quality Assurance Manual, Revision 1, February 1, 1988, Section 14.0, Quality Assurance/Quality Control Audits.

QA audits and surveillances are performed in accordance with the implementation methods described in the aforementioned documents, as amplified or modified by the following discussion of QA audits and surveillance activities of particular significance. Monthly surveillances of the IT

Knoxville central files are performed. Sampling and Analysis Plan (SAP) audits are performed quarterly.

4.5.4 Corrective Action

Nonconformance identification, reporting, disposition, corrective action performance, verification, and acceptance will be in accordance with the requirements contained in the following:

- IT Engineering Operations Quality Assurance Manual, Revision 1, July 1, 1987, Section 8.0, Nonconformances/Corrective Action.
- IT Analytical Services Quality Assurance Manual, Revision 1, February 1, 1988, Section 13.0, Nonconformances and Corrective Action.

Nonconformance identification, reporting, disposition, corrective action performance, verification, and acceptance were performed in accordance with the aforementioned documents, as amplified or modified by the following discussion of nonconformances and corrective action activities of particular significance.

Items, services, or activities that do not meet SAP requirements or IT accepted standard practice are to be reported as nonconformances if they meet any of the following criteria:

- Are detrimental to quality if not corrected immediately and are not corrected immediately
- Are detrimental to quality if not ultimately corrected, are not corrected immediately, and are not tracked by a system that will ensure their timely correction
- Are of a nature such that others can benefit from learning of the circumstances so they can take appropriate preventive action for their activities, and a Nonconformance Report is judged the most appropriate way to communicate this information
- Pertain to items that should be segregated or visually identified to preclude inadvertent use
- Are significant conditions adverse to quality in which case they require reporting so that the cause of the condition can be determined and appropriate corrective action taken to preclude recurrence
- Are equipment that fails calibration or becomes impaired during use and is not immediately repaired.

Nonconformance Reports prevent the installation of items, the use of services, or the performance of activities that are detrimental to quality and provide for their correction. Nonconformance Reports also disseminate "lessons learned" information so appropriate preventive measures can be taken by others. And finally, Nonconformance Reports can provide invaluable information

identifying the need for, and triggering the initiation of, corrective actions to preclude recurrence of significant conditions adverse to quality.

Each nonconformance affecting quality is documented, normally by the person that identifies or creates it. For this purpose, a Nonconformance Report form or audit report is used as appropriate. The project manager determines the appropriate corrective measures to be taken and obtains the concurrence of the QA Officer (QAO).

Nonconformances identified within IT analytical laboratories are reported in accordance with Section 13.0, Nonconformances and Corrective Action, of IT Engineering Operations (ITEO) QA Manual, except laboratory nonconformances identified during ITEO-performed audits, which are reported in accordance with Section 14.0 Quality Assurance/Quality Control, of the aforementioned document. The QAO is provided with copies of ITEO Nonconformance Reports and audit reports that identify nonconformances adversely affecting the quality of the data.

Nonconformances identified during audits conducted by or under the direction of the QAO are reported in accordance with Section 11.0, Quality Assurance Audits, of the IT Engineering Operations QA Manual.

All other nonconformances are to be reported on a Nonconformance Report. The person(s) identifying or creating a nonconformance is responsible for reporting it, unless assurance is provided that it will be reported by someone else and the issuance of the report is verified by the person identifying or creating the nonconformance.

4.5.5 Data Collection

Data collected during execution of the study was recorded in a bound controlled laboratory notebook. Data generated from integrators and computerized instruments were printed and the resulting data sheets are kept with the project file. All data were verified and checked by a BAC scientist. Proof of verification is the dated signature of the checker at the bottom of each notebook page.

5.0 Results and Discussion

The results of the treatability study have been segregated into several sections describing the various aspects of the study.

5.1 Biological Site Characterization

Chemical, physical, and microbiological characteristics of site samples were investigated. The following subsections discuss the results of this characterization.

5.1.1 Site Characteristics

The chemical constituents present in site groundwater were evaluated during the initial phases of this study. The concentration of VOCs observed in five site samples is shown in Table 3. Ethyl benzene was the most prevalent compound with lower concentrations of toluene and benzene found in two wells. Table 4 shows the concentration of metals in a groundwater composite sample. The metals content was generally low with the exception of common soil metals, iron, calcium, magnesium and aluminum. Table 5 provides data on other groundwater characteristics.

5.1.2 Site Bioassessment

In addition to the general site characteristics, soil and groundwater samples were subjected to a battery of tests designed to evaluate the potential for implementing a successful in situ bioremediation treatment strategy. Soil and groundwater samples were analyzed for several microbiological, physical, and chemical parameters known to impact bioremediation. Sample pH, soil moisture content, residual nutrient content, and groundwater mineral content were determined. The compatibility of nutrients with groundwater and the adsorption of nutrients by soil-groundwater slurries were also determined. Microbiological characteristics such as the population density of aerobic heterotrophic bacteria, hydrocarbon-degrading bacteria, and DEHP-degrading bacteria were quantified in each sample. For the purpose of this evaluation, hydrocarbon degraders are those organisms capable of using benzene, ethyl benzene, toluene, and xylene as their only carbon and energy source. The response of bacteria to nutrient and oxygen stimulation was also evaluated. The ability to transport oxygen was evaluated by examining the stability of hydrogen peroxide in soil-groundwater slurries and the potential for sustaining a high dissolved oxygen content in the sample slurries.

5.1.2.1 pH

The pH of each site soil and groundwater sample is shown in Tables 6 and 7, respectively. The optimal pH for bioremediation is generally accepted to be within the range of 6 to 8. A pH outside of this range may reduce microbial metabolism and biodegradation. The soil pH ranged from 5.6 to 7.7. All of the soil samples except one had a pH within the preferred range. The groundwater

sample had pH 6.4. Adjustment of the pH will not be necessary initially. Periodic monitoring will determine if adjustments become necessary as bioremediation proceeds.

5.1.2.2 Nutrient Analysis

The nitrogen as ammonia and ortho-phosphate content of site soil and groundwater samples is shown in Tables 6 and 7. The nitrogen content of soil ranged from nondetectable to moderate. Ammoniacal nitrogen in groundwater was low. The phosphate content in the soil was generally high but nondetectable in the groundwater. Therefore, nutrient additions will be necessary for successful bioremediation.

Although the phosphate content of the soil was high and may be adequate for bioremediation, the availability of phosphate for use by soil microbes is difficult to predict because of the strong binding affinity between soil and phosphate. Periodic monitoring will determine the utilization of nitrogen and phosphate and also aid in establishing the frequency of nutrient augmentation.

5.1.2.3 Total Organic Carbon Analysis of Groundwater

The total organic carbon content of the groundwater was 17 to 18 mg/L (Table 8). This value represents low organic carbon loading in the groundwater.

5.1.2.4 Mineral Analyses

The calcium, magnesium, and iron content of groundwater was evaluated because these elements can catalyze chemical reactions that may interfere with aquifer bioremediation. The divalent cations, calcium and magnesium, react with phosphate to form an insoluble precipitate. In the case of severe phosphate precipitation, wells and geological formations can become clogged.

Hydrogen peroxide is frequently used as an oxygen source for aquifer bioremediation. As hydrogen peroxide decomposes, oxygen is liberated. Soluble iron can react with hydrogen peroxide to form insoluble iron oxides and hydroxides. Because the rate at which peroxide decomposes is related to its ultimate efficiency in transporting oxygen through an aquifer, iron can limit oxygen movement.

The calcium, magnesium and iron content of site groundwater is shown in Tables 4 and 7. The concentration of calcium and magnesium was moderate; the iron content was high. Nutrient precipitation due to dissolved minerals may be a problem due to the moderate calcium content of the groundwater. Hydrogen peroxide decomposition is difficult to predict based on iron measurements alone because soil composition and the organic content of the soil also plays a significant role in hydrogen peroxide decomposition.

5.1.2.5 Nutrient Compatibility

In order to determine the interaction between calcium, magnesium, and phosphate, a nutrient compatibility test was performed. The microbial nutrient blend Restore® 375 contains tripolyphosphates that act as calcium and magnesium chelators; therefore, by adding more Restore® 375, less precipitation occurs due to the increased concentration of the chelator.

The initial addition of Restore® 375 (10,000 mg/L) was based on the chelating power of the nutrient blend and the mineral content of the groundwater. The groundwater was observed for the formation of precipitate following the first addition of nutrients. If precipitation occurred, additional doses of nutrient were applied until the precipitate redissolves.

The groundwater composite received the first nutrient amendment of 10,000 mg/L with no precipitation or cloudiness. These results indicate that nutrient amendment to the groundwater can be accomplished with no anticipated complications.

5.1.2.6 Nutrient Adsorption

Soils generally have an affinity for ammonium and phosphate. The binding capacity of a soil impacts the ability to transport nutrients away from the injection area. The data in Figure 3 show the amount of ammonia, phosphate, and chloride bound to a composite of the soil samples after each of three nutrient additions. The results indicated that after the initial addition of nutrients, approximately 40 percent of the ammonium, 80 percent of the added phosphate, and none of the chloride bound to the soil. The adsorption of ammonium and phosphate to the soil was initially high but showed signs of saturation and reduced adsorption with each subsequent addition of nutrients.

The results of the nutrient adsorption test suggest that significant amounts of the added nutrients will initially bind to the soil. However, binding capacity of the soil will saturate as nutrients are added, thus permitting nutrient transport through the aquifer.

5.1.2.7 Hydrogen Peroxide Stability/Oxygenation Potential

Transport of oxygen through an aquifer is usually the limiting factor for in situ bioremediation. Oxygenation has been achieved successfully by applying hydrogen peroxide. When hydrogen peroxide decomposes, the resulting oxygen may be present as dissolved oxygen or as free oxygen gas. The movement of oxygen through an aquifer depends on the persistence of hydrogen peroxide and the level of dissolved oxygen in the water over time.

Figure 4 tracks the persistence and concentration of dissolved oxygen in a 9 parts water to 1 part soil slurry composed of site samples. The slurry was initially amended with about 868 mg/L hydrogen peroxide. Oxygen concentration was quantitatively tracked until changes in the oxygen

distribution between gaseous and dissolved phases became asymptotic. The data in Figure 4 show the amount of oxygen lost to the gas phase and the amount of dissolved oxygen defined as dissolved oxygen plus residual hydrogen peroxide.

Hydrogen peroxide at 600 mg/L will decompose into approximately 280 mg/L of oxygen. After about 2 hours, the dissolved oxygen content of the slurry was about 100 mg/L, and release of gaseous oxygen, as a result of hydrogen peroxide decomposition, was becoming asymptotic. Continued monitoring for a total of 4.5 hours indicated that about 70 mg/L of dissolved oxygen was still present.

A second application of 600 mg/L hydrogen peroxide was made. Decomposition progressed at about the same rate observed for the first application. Overall, the results indicated moderate hydrogen peroxide stability. Oxygenation of the aquifer using hydrogen peroxide should be acceptable.

5.1.2.8 Microbial Enumerations

The spread plate technique was used to determine the density of the microbial population in each sample. Total heterotrophic microbes were grown on dilute nutrient agar. Hydrocarbon-degrading microorganisms were cultured on a mineral salts medium with the sole carbon and energy source being benzene, ethyl benzene, toluene, and xylene vapor. Phthalate degraders were cultured on mineral salts medium containing DEHP as the sole carbon and energy source. Microbial enumerations are shown in Table 9. Based on practical experience, the precision of the plate count method is approximately 0.5 order of magnitude.

The heterotrophic, hydrocarbon-degrading, and phthalate-degrading microbial population densities observed in soil samples were high. The microbial density in groundwater samples was moderate to high.

5.1.2.9 Microbial Stimulation

The response of native microorganisms to oxygenation and nutrient augmentation is an important factor in determining the likelihood of enhancing biodegradation. Table 10 shows the results of microbial stimulation tests. Because stimulation was measured as growth of bacteria, the plate count method was used to quantitate the level of microbial activity induced by oxygenation and nutrient augmentation. Increase in microbial population density greater than 0.5 order of magnitude is considered to be a positive response. As indicated in Table 10, heterotrophs, hydrocarbon-degrading bacteria, and phthalate-degrading bacteria in most samples responded to oxygenation and nutrient amendment by increasing in cell density by greater than 0.5 order of magnitude. Heterotrophs in sample ST-2A failed to respond to treatment, hydrocarbon degraders showed a weak response, but phthalate degraders responded very well to both treatments. Bacteria

in groundwater (Table 10) responded favorably to stimulation as indicated by growth in the presence of oxygen and nutrients.

In general, the results of the microbial stimulation tests indicated that under appropriate conditions, microbes present within the impacted soils and aquifers should respond favorably to nutrient and oxygen amendment. Nutrients enhanced the growth of bacteria in all cases except heterotrophs and hydrocarbon degraders in sample ST-2A.

5.2 Biotreatability Study Results

The results of each evaluation made during the groundwater batch biotreatability study are described in the following sections.

5.2.1 Reduction in Target Compound Concentration During Treatment

The loss of ethyl benzene, xylene, and DEHP was determined at four points during the batch groundwater biotreatability test (Figure 5). The results indicate that biological treatment contributed to the removal of target compounds from biologically active treatments. The biologically inhibited treatment (GW, HgCl & Ntr) indicates the loss of target compounds through physical processes such as volatilization and adsorption to the reaction vessel. The vapor pressures of ethyl benzene and xylene are high enough that an appreciable amount of these compounds should volatilize and be lost when the treatment vessels were opened for sampling. The results shown in Figure 5 suggest this occurred. The vapor pressure of DEHP is so low that volatilization is not a major contributor to the abiotic loss of DEHP from the treatment vessels. The zero headspace treatment represents the absolute change attributable to experimental and analytical artifacts in a completely untreated control. A 45 percent loss of ethyl benzene, 33 percent loss of xylene, and 18 percent loss of DEHP was observed in this control treatment based on the analysis performed by the BAC laboratory. Ethyl benzene and xylene removal in all biologically active controls was greater than 99.9 percent. Volatilization could account for 80 percent of the ethyl benzene loss and 75 percent of the xylene loss. DEHP removal in the two treatments using indigenous microbes was approximately 99.7 percent. DEHP removal by the activated sludge treatment was only 86 percent.

The significance of target compound removal was evaluated using ANOVA and the F Test. Complementary statistical analyses were performed based on BAC analysis of each treatment and target compound analysis performed according to U.S. EPA protocols at an IT Analytical Services laboratory. The results of the statistical comparisons of each treatment are shown in Tables 11 and 12.

The results are the same using either analytical method for ethyl benzene and xylene. For these two compounds, a significant difference at the 95 percent confidence level was observed between

the biologically active treatments and the abiotic and the untreated conditions. There was also a significant difference between the abiotic treatment and the zerohead space control. This difference is attributed to volatilization in the abiotic treatment that was opened two more times than the zero headspace treatment. No difference in the removal of ethyl benzene and xylene was observed among any of the biologically active treatments. These results strongly suggest that the biological component of the treatment process contributed to the removal of ethyl benzene and xylene.

The same statistical process was used to evaluate the removal of DEHP from each treatment. The results vary slightly depending on the method of DEHP analysis. Biological treatment was shown to significantly contribute to DEHP removal at the 95 percent confidence level. Using BAC analytical data for DEHP removal, a significantly greater DEHP removal was detected in groundwater treated with indigenous microbes compared to the treatment augmented with activated sludge. No difference was detected between the native groundwater and groundwater augmented with DEHP degrading bacteria isolated from site groundwater. Using DEHP data generated by U.S. EPA methodology, no difference was detected among the biologically active treatments.

5.2.2 Biodegradation Rate Constants and Half-Lives

The biodegradation rate constant was determined from the target compound removal data. Figure 6 indicates the degradation rate constant and half-life for DEHP in each treatment. The biologically active treatments had larger rate constants and shorter half-lives than the mercury treated control. The treatments containing indigenous microbes had much shorter half-lives for DEHP than the activated sludge treatment.

The removal data for ethyl benzene and xylene were not appropriate for regression analysis of rate constants and half-lives; therefore, the initial concentration and the concentration at the first sampling point were used. In the case of ethyl benzene, the degradation rate exceeded the sampling frequency; therefore, the concentration was nondetectable at the first sampling point. The estimated biodegradation rate constant for ethyl benzene is $\geq -0.2 \text{ hrs}^{-1}$ with a half-life of $\leq 3.3 \text{ hrs}$ based on complete removal within 43 hours. The biodegradation rate constant and half-life were also calculated for xylene using the initial concentration and the concentration at the first sampling point. The rate constant for the activated sludge treatment was -0.2 hrs^{-1} with a half-life of 3.3 hours. The rate constants for the two treatments containing indigenous microbes were essentially the same with a rate constant of -0.02 hrs^{-1} and a half-life of 37 to 39 hours.

5.2.3 Total Dissolved Organic Carbon Content During Treatment

The reduction in TOC during the test period is shown for each treatment in Figure 7. The general trends in TOC removal are consistent with the removal of target compounds in Figure 5. The TOC in the activated sludge augmented treatment is higher than for other biologically active treatments due to the TOC contributed by decaying sludge. The TOC in the DEHP-degrading bacteria

augmented treatment (GW, Soil, & Ntr) was slightly higher than the groundwater (GW & Ntr) treatment for the first two sampling points. At later points in the test, the TOC of these two treatments was essentially the same. The initially higher TOC in the GW, Soil & Ntr treatment was attributed to soluble organic carbon associated with the bacteria used to augment this treatment. Volatile suspended solids analysis of these treatments supports this interpretation. As indicated in Figure 8, the volatile solids content of these two treatments quickly equalized to the same value and remained very similar for the rest of the study. The microbial density of these treatments, reported in Figure 9, also supports population equilibration to the same level.

5.2.4 Respiration During Treatment

Figure 10 tracks microbial respiration in each treatment except the zero headspace control. The figure shows the mean \pm one standard deviation at each point collected during the study. Because the data collection frequency was 2 hrs, data were plotted as a line rather than as individual points. The results indicate that the activated sludge augmented treatment consumed over two times more oxygen than the other biologically active treatments; however, target compound loss was not enhanced as shown in Figure 5 and Tables 11 and 12. This treatment represents an unfavorable alternative because much more oxygen was required to achieve the same result. Oxygen consumption by the treatment augmented with DEHP degraders was slightly greater than the unaugmented groundwater treatment. The effectiveness of the mercury treatment for inhibiting biological activity was demonstrated by the virtual absence of oxygen consumption by these treatments.

5.2.5 Inorganic Carbon Production During Treatment

The production of inorganic carbon (CO_2) complements the consumption of oxygen. However, absolute comparisons of oxygen consumed and carbon dioxide produced are difficult because some organic carbon is converted into biomass rather than being mineralized. Table 13 shows the amount of oxygen consumed, the total inorganic carbon (TIC) (carbon dioxide) generated, and the TOC consumed during the study. Observed oxygen consumption was slightly higher than expected based on TIC produced and TOC consumed for the groundwater treatment and the DEHP degrader augmented treatment; however, the slight difference in observed and expected oxygen consumption suggests that both treatments efficiently mineralized TOC. These results are in contrast to those observed for the activated sludge treatment which was much less efficient in mineralizing TOC.

5.2.6 Microbial Density During Treatment

Figure 9 tracks the microbial density of heterotrophs and phthalate-degrading bacteria at the start of treatment and at the end. The microbial density in the groundwater and nutrient treatment increased during treatment. The microbial density of the activated sludge and the phthalate-degrader amended treatments decreased during treatment. The abiotic control contained no bacteria and the

zero headspace treatment had a low stable heterotroph population. The phthalate degrader density decreased during incubation.

Total suspended solids (TSS) and volatile suspended solids (VSS) analyses were performed on each treatment. The average TSS and VSS for each treatment are shown in Figures 11 and 8, respectively. Solids analyses generally confirmed the microbial density determinations shown in Figure 9. However, the solids data for the abiotic control indicated an increase in TSS and VSS. This was due to a visibly noticeable precipitate caused by the presence 500 mg/L HgCl_2 . Precipitates were not observed in any other treatment.

Volatile solids for the groundwater and phthalate degrader-amended groundwater treatments had equalized by the end of the study. This observation suggests that the addition of extra bacteria will not have a long-term effect on the native population density. Similarly, the volatile solids content of the activated sludge treatment gradually fell after the first few hours of treatment.

5.2.7 Nutrient Utilization During Treatment

Ammonia and ortho-phosphate concentrations in each treatment were examined. No appreciable reduction in nutrient concentration occurred during treatment (Figures 12 and 13).

5.2.8 Changes in pH During Treatment

Change in system pH was measured during treatment as indicated in Figure 14. Data represent the mean of the measurements taken from the triplicates of each treatment. The abiotic control and the zero headspace control had an essentially constant pH. The activated sludge treatment displayed an obvious acidification while the other biologically active treatments became slightly alkaline.

5.3 Soil Flushing Data Analysis and Interpretation

5.3.1 Sample Selection

Eighteen polyethylene sleeves from Shelby tube samples were received by the IT laboratory for use in a soil flushing treatability study. All samples were collected on February 7, 1992 by WESTON personnel and are referenced as to exact location and depth within the site (Appendix A). All sleeves were visually inspected so as to characterize the samples based on color, texture, and integrity (whether the sample was intact or disturbed). Based on this inspection and the sampling information, individual samples were selected for either geotechnical testing or soil flushing. Samples not considered to be suitable for either of these tests were not used in the study. All samples and their fate are listed in Table 14.

5.3.2 Initial Phthalate Analysis

Soil samples to be used in the soil flushing treatability study were selected based on an initial analysis of the phthalate concentration in selected samples. A 50 g aliquot of soil was collected from the top part of each sleeve for analysis. Sample preparation and analysis was conducted according to standard operating procedures. Selection was based on sample integrity, sample depth, estimated phthalate concentration (determined during initial site characterization), and site location. Based on these criteria, five Shelby tube samples were selected from the 18 samples received by the laboratory.

The samples selected were ST-4D (12 to 36 inches), ST- 3B (0 to 24 inches), ST-3A (24 to 48 inches), ST-2A (72 to 96 inches) and ST-2B (48 to 72 inches). The phthalate concentration for each sample was 0.04, 0.6, 11.1, 19.0 and 0.3 g/L, respectively. Based on this information, samples, ST-2A , ST-3A, and ST-4D were selected for use in the soil flushing treatability study. The ST-3A sample contained sufficient soil to be used in two cells of the flushing study.

5.3.3 Geotechnical Characteristics

5.3.3.1 Shelby Tube Samples

Six Shelby tube samples were selected from the remaining polyethylene sleeves for geotechnical characterization. Site areas that were targeted for geotechnical evaluation were those areas with low to medium levels of contamination. Samples selected represented four depth intervals, 0 to 24, 24 to 48, 48 to 72 and 72 to 96 inches. The vertical cross section of the soil profile depicted by these samples selected was considered representative of the geotechnical characteristics of the site. Geotechnical characteristics of the six selected soil cores are described in Table 15.

5.3.3.2 Soil Flushing Samples

Geotechnical characteristics of the soil samples used in the four flexible wall permeameter cells are given in Table 16. The three Shelby tube samples used in the soil flushing study are as follows:

Cell 1	ST-2A (72 to 96 inches)
Cell 2	ST-3A (24 to 48 inches) (top section)
Cell 3	ST-3A (24 to 48 inches) (bottom section)
Cell 4	ST-4D (12 to 36 inches).

An important geotechnical characteristic used in evaluating the flushing efficiency of a soil sample is the volume of voids. The total volume of voids in cubic centimeters (cc) for a given sample is described as one pore volume for that sample. This characteristic is used in describing the volume of flushing solution passing through the sample for a given flushing time period. The pore

volumes for the soils used in the flushing study ranged from a low of 53.9 cc for Cell 1 soil to a high of 153.7 cc for Cell 3 soil.

5.3.4 Initial Chemical Characterization of the Soil Flushing Samples

Soil was collected from each of the Shelby tube sleeves selected for use in the flushing study. Samples were taken from a composite of the soil adjacent to the actual soil sample used in each of the cells. Because soil cannot be collected directly from the actual sample used in a cell, the homogenized soil sample provided an estimate of the analyte concentration for the soil in each cell. These results are not intended to represent the actual starting concentration of analytes in the soil within the treatment cells.

All three soils were initially analyzed by GC/MS for priority pollutant volatile organic compounds VOCs (U.S. EPA SW-846 method 8240) and priority pollutant semivolatile organic compounds SVOCs (U.S. EPA SW-846 method 8270). A library search was conducted on all samples for other volatile and semivolatile nontarget analytes. TOC by U.S. EPA Methods 415.1 and 9060 was determined for each soil. Table 17 contains a listing of detectable analytes and their concentrations in each of the three soil samples selected for the flushing study.

The soil used in Cell 1 showed the highest concentration of VOCs and, in particular, the two targeted VOCs, ethyl benzene (130 mg/kg) and total xylenes (570 mg/kg). Total xylenes were detected Cells 2 and 3 and Cell 4 soils at 11 and 2.2 µg/kg, respectively. No ethyl benzene was detected in these two soils.

Phthalate concentrations in all three soils were very high, especially DEHP, the targeted SVOC in this study. The concentrations of DEHP in Cell 1, 2 and 3, and 4 soils were 1900, 650 and 840 mg/kg, respectively. The total phthalate concentrations equalled 0.2, 0.06, and 0.1 percent for Cells 1, 2 and 3, and 4, respectively. Few other priority pollutant SVOCs were detected in the initial soil analysis.

5.3.5 Flushing Solutions and Flow Characterization

5.3.5.1 Flushing Solutions

The soil flushing study was divided into two phases based on changes in the flushing solutions used for each phase. In Phase I potable water was used as the flushing solution in all four cells. The water was allowed to set open to the atmosphere for 24 hours prior to use in the flushing study. The pH of the water was 6.5.

In Phase II of the study, the flushing solution was changed. Initial results from the first leachate collection period indicated that little or no phthalates were eluted from the soil using just tap water.

Therefore, half way through the projected study period (30 days), the flushing solution changed for three of the four cells as described below:

Cell 1	0.5 percent Brij 30/35 aqueous solution
Cell 2	H ₂ O ₂ aqueous solution
Cell 3	Potable water
Cell 4	0.5 percent Tween 85 aqueous solution.

These flushing solutions were used throughout the 29 days of the second half of the soil flushing study.

5.3.5.2 Flow Characterization

The flushing solution flow patterns for both study phases are illustrated in Figure 15. Flow volumes were determined gravimetrically and converted to volume using a 1.0 g/cc conversion factor. Both patterns show a linear flow volume with respect to time. A deviation in flow rate occurred after 20 days of operation. This slight depression in flow volume was a result of a temporary power failure to the peristaltic pump.

Tables 18 and 19 give individual and accumulative flow rates for all four samples during Phases I and II, respectively, of the study. Accumulative flow volumes for the 30 days of Phase I ranged from 26,926 mL for Cell 4 to 28,598 mL for Cell 1. During the 29 days of flushing in Phase II, accumulative flow volumes ranged from 26,230 mL for Cell 4 to 26,965 mL for Cell 3.

5.3.6 Soil Flushing Results

5.3.6.1 Phase I

The effectiveness of potable water as a flushing solution in removing VOCs and SVOCs from soils is illustrated in Tables 20 through 24. The results show the amount of each analyte detected in the leachate from each cell for two collection periods at Day 4 and Day 30. The amount of each analyte in a composite of all leachate from each cell is also presented, as well as the total amount each analyte collected during the entire Phase I flushing period. These values are derived from analyte concentration values (Appendix D) for each cell and collection period and represent the total amount of leachate collected for each flushing period (Table 18).

Water was effective in removing VOCs from each of the four soil samples. Relatively high amounts of ethyl benzene and total xylenes were removed during the first 4 days of soil flushing as compared to the amount removed during the final 3 days or the amount contained in the composite samples. It should be noted that the composite samples, although stored at 4°C following collection, were not analyzed until the conclusion of the study with storage times of 30 to 50 days.

This length of time may have resulted in the gradual loss of VOCs resulting in low to nondetectable levels in the composite samples.

Water was not effective in removing phthalates from soil. Little or no phthalates were detected in either of the collection period samples or the composite samples. The only phthalate that responded to flushing from all four samples was diethyl phthalate and this was only during the initial 4 day flushing period. No phthalates were detected in the leachates for the second collection period at 30 days, which was at the end of the Phase I flushing.

5.3.6.2 Phase II

The results from the Day 4 leachate indicated that water was not an effective leaching agent for phthalates in soil. At this point, the water was amended with reagents to enhance the solubility of phthalates thus aiding in their removal from soil. Earlier efforts with two surfactants, Brij 30/35 and Tween 85, involving the removal of nonaqueous phase substances from soils, indicated that phthalates might also be effectively removed with a surfactant-amended flushing solution.

Therefore, these two surfactants were tested for the last 30 days in Phase II of the soil flushing study. Each surfactant was supplied via flushing solution to a single cell at a concentration of 0.5 percent weight to volume (Cell 1 - Brij 30/35, and Cell 2 - Tween 85). As a comparative measure, the flushing solution for Cell 3 was retained as potable water. In an effort to elucidate the effects of microbial enhancement on phthalate degradation, a hydrogen peroxide and nutrient-amended flushing solution was supplied to Cell 2 during Phase II of the study.

Brij 30/35 Flushing Solution. Table 20 shows the effect of a 0.5 percent Brij 30/35 surfactant amended flushing solution on the removal of VOCs and SVOCs from Cell 1 soil. Analysis of the leachate collected during the first 3 days of Phase II flushing indicated that ethyl benzene was the only VOC being flushed from the soil. A concentration of 1,800 µg/L was detected in the 3-day leachate and 260 µg/L was detected in the 29-day leachate. Once again the composite sample showed no detectable levels of any VOC.

The effect of a 0.5 percent Brij 30/35 flushing solution on removal of phthalates from soil is also illustrated in Table 20. The concentration of DEHP in the 3-day leachate was 61,000 µg/L, and 3,200 µg/L in the 29-day leachate. Analysis of the leachate composite collected during the interim flushing periods between days 3 and 26 of Phase II of the study indicated that a constant removal of this analyte was occurring. The concentration of DEHP in the composite leachate was 6,500 µg/L.

The only other two phthalates that responded to a Brij 30/35 amended flushing solution were butylbenzylphthalate and di-n-octyl phthalate. However, they were detected at much lower concentrations than the DEHP.

Potable Water Flushing Solution. The continued use of potable water as a flushing solution during Phase II of the flushing study indicated a similar pattern as the Phase I results. Table 21 shows the effect of potable water in removing VOCs and phthalates from Cell 2 soil during the 29 days of flushing. Low concentrations of benzene and toluene were detected in the 3-day, 29-day, and composite leachates. However, potable water was ineffective in removing phthalates from soil. Only 2 µg/L of diethyl phthalate was detected in the 29-day leachate.

H₂O₂ and Nutrient Amended Flushing Solution. The effect of a H₂O₂ and nutrient amended flushing solution on removing VOCs and SVOCs from Cell 3 soil is shown in Table 22. Very low concentrations of targeted VOCs were detected in the 29-day leachate, and only one phthalate, butylbenzylphthalate, was detected in the composite leachate. However, contaminant degradation by microbial activity was not expected to significantly increase the amount of analytes removed in the flushing solution. Approximately 30 mg/L of oxygen was consumed per pore volume of solution. This equates to a total consumption of 855 mg of oxygen over 30 days assuming a 3.8-hour retention time. Also, assuming that 5.3 mg of oxygen are required to mineralize 1 mg of organic carbon to carbon dioxide, 161 mg of organic carbon could have been mineralized during the 30-day treatment period. This is equivalent to 218 mg of DEHP. The absolute performance of the biologically enhanced cannot be determined because the true starting concentration of target compounds is not known.

Tween 85 Flushing Solution. Table 23 shows the effect of a 0.5 percent Tween 85 amended flushing solution on the removal of VOCs and SVOCs from Cell 4 soil. VOCs were not detected in the 3-day leachate and only low levels were detected in the 29-day and composite leachates. There were some responses from SVOCs to the Tween 85 amended flushing solution. Butylbenzylphthalate (190 µg/L) and DEHP (490 µg/L) were detected in the 3-day leachate during Phase II of the soil flushing study. However, only DEHP was detected in the 29-day leachate (360 µg/L) and the composite leachate (38 µg/L).

5.3.7 Soil Flushing Effectiveness

The effectiveness of soil flushing should be evaluated based on a number of factors: (1) the initial and final concentrations of individual analytes in the soil; (2) the concentration of each analyte in the leachates as a function of time; and (3) the total amount of each analyte removed from the soil relative to the total number of pore volumes of flushing solution moving through the sample during the soil flushing study.

5.3.7.1 Final Soil Analysis

The final soil analysis is given in Table 24. Comparison of these data with initial concentration data contained in Table 17 indicates that many of the analytes initially detected in the soil were not present in the soil at the conclusion of the flushing study.

VOCs were primarily detected in the Cell 1 sample (ST-2A) taken from the 72 to 96-inch soil depth. Of the eight VOCs (including two targeted VOCs, ethyl benzene and total xylenes) detected in the initial soil analysis, only ethyl benzene was detected in the final soil analysis.

There were 25 SVOCs detected in the initial soil analysis, seven of which were phthalic analytes. Only four SVOCs (three phthalic analytes) were detected in the final soil analysis. DEHP and di-n-octyl phthalate were detected in all three soil samples at the conclusion of the soil flushing study.

It must be emphasized that the comparison between the initial and final soil concentrations is strictly a relative comparison, and in no way reflects a quantitative reduction in respective analytes. An estimate of the quantitative reduction in specific analytes can only be accomplished by mass balancing the analytes within the soil flushing system.

5.3.7.2 System Mass Balancing

The total amount of each analyte removed during the soil flushing process is a product of the concentration of individual analytes in the leachate during each collection period and the total volume of leachate for that specific collection period. The total amount of VOCs and SVOCs removed from soils for each collection period during the two phases of the soil flushing study are given in Tables 25 through 28 for Cells 1 through 4, respectively.

The most interesting comparison within these tables is the difference in the amount (sum) of individual analytes collected during the Phase I and Phase II parts of the study. Most VOCs were removed from the soil during Phase I of the soil flushing process. However, data for Cell 1 (Table 25), which incorporated a 0.5 percent Brij 30/35 flushing solution, resulted in 50 percent more ethyl benzene being removed during Phase II of the study as compared to Phase I. It must be noted that this particular soil still had the highest concentration of ethyl benzene at the end of the study. Data in Table 28 also indicated that higher levels of benzene and toluene were removed from soil with the addition of a 0.5 percent Tween 85 flushing solution as compared to using just potable water.

The effect of adding surfactant amended flushing solutions on the total amount of phthalates removed from soil is clearly illustrated in Tables 25 and 28. Table 25 shows that butylbenzylphthalate, DEHP, and di-n-octyl phthalate were not removed with potable water; however, the addition of a 0.5 percent Brij 30/35 solutions removed 1,669, 369,928 and 1,221 µg

of each analyte respectively. Even the use of a 0.5 percent Tween 85 flushing solution removed 610 µg of butylbenzylphthalate and 3,630 µg of DEHP from the soil as compared to none being flushed using just potable water (Table 28).

Table 29 shows the total percent and amount of each analyte removed in the leachate during each phase of the soil flushing study. In addition, the total amount of VOCs adsorbed by the Tenax resin columns from the head space of the collection vessels and the amount of individual analytes still remaining in the soil at the conclusion of the flushing study are given. A mass balancing of individual analytes within the soil flushing system for this study is derived from summing these components to derive an original starting amount of each analyte within the soil at the beginning of the flushing study. A percent reduction in each analyte is then calculated based on this back-calculation method of mass balancing the system.

Almost 100 percent of all VOCs were removed from the soils in all four cells during the two phases of the soil flushing process. In many cases, over 50 percent of each analyte was removed during Phase I flushing using potable water. VOCs were extremely high in Cell 1 soil with over 17,000 µg (100 percent) removed during Phase I of the flushing study. In comparison, nearly 11,000 µg of ethyl benzene was flushed during the entire 60-day study, this equalled approximate 42 percent of the initial amount present in the soil.

Response of phthalates to soil flushing is also shown in Table 29. The most successfully flushing solution for removing phthalates, and specifically DEHP, was a 0.5 percent Brij 30/35 solution. Nearly 370 mg of DEHP (87 percent) was removed from Cell 1 soil during Phase II flushing using a surfactant-amended flushing solution as compared to none being flushed from the same soil use potable water during Phase I of the study. Sixty-four percent of butylbenzylphthalate (1,669 µg) and 48 percent of di-n-octyl phthalate (1,221 µg) were also flushed from the soil using the Brij 30/35 solution.

In contrast, only 2 percent of DEHP (3630 µg) was flushed from Cell 4 soil using a 0.5 percent Tween 85 flushing solution. Phthalates were not detected in the leachate from Cell 2 and Cell 3 soils as a result of H₂O₂/nutrient amended and potable water flushing solutions. Much lower amounts of DEHP were detected in Cell 2 and Cell 3 final soils, which may have influenced its availability for flushing.

Table 1
Batch Study Treatments
L. E. Carpenter and Co., IT Project No. 408474

Treatment	Nutrients and Oxygen	Number of Vessels
Indigenous Microbes	Yes	3
Activated Sludge	Yes	3
Soil Microbes	Yes	3
Biologically Inhibited	Yes	3
Zero Headspace Untreated Control	No	3

Table 2
Batch Study Analytical Schedule
L. E. Carpenter and Co., IT Project No. 408474

Parameter	Sampling Schedule
Total Solids (dissolved and suspended)	T ₀ , T ₁ , T ₂ , T _{final}
pH	T ₀ , T ₁ , T ₂ , T _{final}
Residual Nutrients (ammonia and phosphate)	T ₀ , T ₁ , T ₂ , T _{final}
VOC and Base Neutrals	T ₀ , T ₁ , T ₂ , T _{final}
Total Organic Carbon	T ₀ , T ₁ , T ₂ , T _{final}
Total Inorganic Carbon	T ₀ and T _{final}
Microbial Enumerations (total and phthalate degraders)	T ₀ and T _{final}

Table 3
Volatile Organic Compounds in Groundwater
L. E. Carpenter and Co. IT Project No. 408474

Compound	Location				
	MW2 (µg/L)	MW3 (µg/L)	MW6 (µg/L)	MW14S (µg/L)	MW15S (µg/L)
Acrolein	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Acrylonitrile	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Benzene	ND (5)	3	14	ND (5)	ND (5)
Bromodichloromethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Bromoform	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Bromomethane	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Carbon Tetrachloride	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Chlorobenzene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Chloroethane	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
2-chloroethylvinyl ether	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Chloroform	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Chloromethane	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Dibromochloromethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
1,1-dichloroethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
1,2-dichloroethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
1,1-dichloroethene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Trans-1,2-dichloroethene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
1,2-dichloropropene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Cis-1,3-dichloropropene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Trans-1,3-dichloropropene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Ethyl benzene	46	2000	13000	ND (5)	ND (5)
Methylene chloride	ND (5)	ND (5)	ND (5)	ND (5)	1 (estimate)
1,1,2,2-tetrachloroethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Tetrachloroethene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Toluene	ND (5)	6	11	ND (5)	ND (5)
1,1,1-trichloroethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
1,1,2-trichloroethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Trichloroethene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Trichlorofluoromethane	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Vinyl chloride	ND (10)	ND (10)	3 (estimate)	ND (10)	ND (10)

ND, nondetectable

Table 4
Metals in Groundwater
L. E. Carpenter and Co. IT Project No. 408474

Metal	Composite Water Sample (mg/L)
Aluminum	15.1
Antimony	ND (0.03)
Arsenic	ND (0.05)
Barium	2.8
Beryllium	ND (0.001)
Cadmium	0.006
Calcium	65.6
Chromium	3.1
Cobalt	0.15
Copper	0.18
Iron	427
Lead	ND (0.03)
Magnesium	23.3
Manganese	150
Nickel	2.4
Potassium	5
Selenium	0.09
Silver	ND (0.005)
Sodium	12
Thallium	ND (0.05)
Vanadium	0.06
Zinc	0.23

ND, nondetectable

Table 5
Groundwater Parameters
L. E. Carpenter and Co. IT Project No. 408474

Parameter	Composite Sample (mg/L)
Acidity as CaCO ₃	86
Alkalinity as CaCO ₃	276
Ammonia as N	0.7
Biochemical Oxygen Demand	14
Chemical Oxygen Demand	57
Total Kjeldahl Nitrogen	3.3
pH	6.3
Specific Conductance (µmhos/cm)	490
Total Dissolved Solids	290
Total Solids	500
Total Suspended Solids	170

Table 6
Physical and Chemical Characteristics of Site Soil
L. E. Carpenter and Co., IT Project No. 408474

Sample	pH	Ammonium (mg/kg)	Phosphate (mg/kg)	Soil Moisture (percent)
ST-1B	5.6	<4	80	8
ST-2A	7.7	63	158	11
ST-4A	7.3	4.7	221	13
Composite	7.4	19	133	11
Composite Dup	7.5	19	139	8

Table 7
Physical and Chemical Characteristics of Site Groundwater
L. E. Carpenter and Co., IT Project No. 408474

Sample	pH	Ammonium (mg/L)	Phosphate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Chloride (mg/L)
Composite	6.4	4.7	<0.5	61.6	33.3	45
Composite Dup	6.4	4.4	<0.5	61.6	29.1	45

Table 8
Total Dissolved Organic Carbon in Site Groundwater
L. E. Carpenter and Co., IT Project No. 408474

Sample	Total Dissolved Carbon (mg/L)	Inorganic Carbon (mg/L)	Organic Carbon (mg/L)
Composite	83	66	17
Composite Dup	83	65	18

Table 9
Enumeration of Heterotrophic and Hydrocarbon-Degrading
Bacteria
L. E. Carpenter and Co., IT Project No. 408474

Sample	Heterotrophs (CFU/g) ¹	Hydrocarbon Degraders (CFU/g)	Phthalate Degraders (CFU/g)
Soil			
ST-1B	4.3 X 10 ⁶	1.6 X 10 ⁶	1.5 X 10 ⁶
ST-2A	3.3 X 10 ⁶	7.7 X 10 ⁵	1.2 X 10 ⁶
ST-4A	4.7 X 10 ⁶	1.5 X 10 ⁶	1.1 X 10 ⁶
Composite	4.7 X 10 ⁶	5.7 X 10 ⁵	8.7 X 10 ⁵
Composite Dup	4.3 X 10 ⁶	1.9 X 10 ⁶	8.2 X 10 ⁵
Groundwater			
Composite	1.4 X 10 ⁵	5.1 X 10 ⁴	8.2 X 10 ³
Composite Dup	1.1 X 10 ⁵	4.0 X 10 ⁴	6.2 X 10 ³

¹CFU/g, colony forming units per gram of dry soil or per mL for groundwater samples.

Table 10
Response of Indigenous Microorganisms to Oxygenation
and Nutrient Amendment
L. E. Carpenter and Co., IT Project No. 408474
 (Page 1 of 3)

Sample	Initial (CFU/mL)	Heterotrophs Oxygen (CFU/mL)	Oxygen and Nutrients (CFU/mL)
Soil			
ST-1B	3.0 X 10 ⁷	5.2 X 10 ⁷	1.4 X 10 ⁸
ST-2A	1.4 X 10 ⁷	2.0 X 10 ⁷	1.1 X 10 ⁷
ST-4A	3.3 X 10 ⁶	3.0 X 10 ⁷	9.4 X 10 ⁷
Composite	9.4 X 10 ⁶	1.7 X 10 ⁸	4.0 X 10 ⁸
Composite Dup	7.4 X 10 ⁶	1.9 X 10 ⁸	4.3 X 10 ⁸
Groundwater			
Composite	3.0 X 10 ⁵	8.8 X 10 ⁶	3.5 X 10 ⁷
Composite Dup	4.5 X 10 ⁵	2.3 X 10 ⁷	8.9 X 10 ⁷

Table 10

(Page 2 of 3)

Sample	Hydrocarbon-Degraders		
	Initial (CFU/mL)	Oxygen (CFU/mL)	Oxygen and Nutrients (CFU/mL)
Soil			
ST-1B	1.6 X 10 ⁷	6.9 X 10 ⁷	3.5 X 10 ⁸
ST-2A	3.2 X 10 ⁶	1.1 X 10 ⁷	7.5 X 10 ⁶
ST-4A	4.0 X 10 ⁶	1.3 X 10 ⁷	3.1 X 10 ⁸
Composite	9.4 X 10 ⁶	1.7 X 10 ⁸	4.0 X 10 ⁸
Composite Dup	7.4 X 10 ⁶	1.9 X 10 ⁸	4.3 X 10 ⁸
Groundwater			
Composite	4.7 X 10 ⁴	4.2 X 10 ⁶	3.6 X 10 ⁷
Composite Dup	6.0 X 10 ⁴	4.4 X 10 ⁶	4.3 X 10 ⁷

Table 10
(Page 3 of 3)

Sample	Phthalate-Degraders		
	Initial (CFU/mL)	Oxygen (CFU/mL)	Oxygen and Nutrients (CFU/mL)
Soil			
ST-1B	1.4 X 10 ⁷	1.7 X 10 ⁷	1.3 X 10 ⁷
ST-2A	9.2 X 10 ⁵	4.8 X 10 ⁷	5.4 X 10 ⁷
ST-4A	1.5 X 10 ⁶	6.6 X 10 ⁶	9.2 X 10 ⁶
Composite	1.4 X 10 ⁶	1.7 X 10 ⁷	2.0 X 10 ⁷
Composite Dup	4.2 X 10 ⁶	6.6 X 10 ⁷	4.1 X 10 ⁷
Groundwater			
Composite	4.7 X 10 ⁴	1.1 X 10 ⁶	7.5 X 10 ⁶
Composite Dup	3.7 X 10 ⁴	1.1 X 10 ⁶	1.0 X 10 ⁷

Table 11

**ANOVA and Comparisons Among Means Based on BAC Lab Data
L.E. Carpenter and Co., IT Project No. 408474**

Ethylbenzene	GW+Ntr	GW+Sludge+Ntr	GW+Soil+Ntr	GW+HgCl+Ntr	Zero Headspace
	0	0	0	9.9	22.3
	0	0	0	8.3	26.5
	0	0	0	8.5	33.6
ΣY	0.00	0.00	0.00	26.70	82.40
mean Y	0.00	0.00	0.00	8.90	27.47
	109.10				
	0.00	0.00	0.00	239.15	2328.50
	2567.65				
	2500.88				
GrandTotal ² /an	793.52				
SStotal	1774.13				
SSgroup	1707.36				
SSwithin	66.77				
ANOVA Table	a= 5.00		n= 3.00	F[0.05(4,10)]= 3.48	
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	1707.36	426.84	63.93	P≤0.05
Within Groups	10.00	66.77	6.68		
Total	14.00	1774.13			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	1707.36	4.00	426.84	63.93	P≤0.05 F[0.05(4,10)]= 3.48
Killed vs Biological	237.63	1.00	237.63	35.59	P≤0.05 F[0.05(1,10)]= 4.96
Untreated vs Biological	2263.25	1.00	2263.25	338.98	P≤0.05 F[0.05(1,10)]= 4.96
Sludge vs Indigenous	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Sludge vs GW	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Sludge vs Soil	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
GW vs Soil	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Untreated vs Killed	2025.62	1.00	2025.62	303.39	P≤0.05 F[0.05(1,10)]= 4.96
Within	66.77	10.00	6.68		
Total	1774.13	14			

Table 11. Page 2 of 3

o-Xylene	GW+Ntr	GW+Sludge+Ntr	GW+Soil+Ntr	GW+HgCl+Ntr	Zero Headspace
	0	0	0	13.1	25.7
	0	0	0	11.3	30.6
	0	0	0	11.4	37.6
Σy	0.00	0.00	0.00	35.80	93.90
mean y	0.00	0.00	0.00	11.93	31.30
$\Sigma \Sigma Y$	129.70				
$\Sigma (y^2)$	0.00	0.00	0.00	429.26	3010.61
$\Sigma (\Sigma Y)^2$	3439.87				
$\Sigma (\Sigma Y)^2/n$	3366.28				
GrandTotal ² /an	1121.47				
SStotal	2318.40				
SSgroup	2244.81				
SSwithin	73.59				
ANOVA Table	a= 5.00		n= 3.00		F[0.05(4,10)]= 3.48
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	2244.81	561.20	76.26 P≤0.05	
Within Groups	10.00	73.59	7.36		
Total	14.00	2318.40			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	2244.81	4.00	561.20	76.26 P≤0.05	F[0.05(4,10)]= 3.48
Killed vs Biological	427.21	1.00	427.21	58.06 P≤0.05	F[0.05(1,10)]= 4.96
Untreated vs Biological	2939.07	1.00	2939.07	399.40 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs Indigenous	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Sludge vs GW	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Sludge vs Soil	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
GW vs Soil	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Untreated vs Killed	2511.86	1.00	2511.86	341.35 P≤0.05	F[0.05(1,10)]= 4.96
Within	73.59	10.00	7.36		
Total	2318.40	14			

Table 11. Page 3 of 3

DEHP	GW+Ntr	GW+Sludge+Ntr	GW+Soil+Ntr	GW+HgCl+Ntr	Zero Headspace
	0.1	2.5	0.07	12.5	13.3
	0.2	1.3	0.08	8.58	14.7
	0.2	3.5	0.05	7.07	14
Σy	0.50	7.30	0.20	28.15	42.00
mean y	0.17	2.43	0.07	9.38	14.00
$\Sigma \Sigma Y$	78.15				
$\Sigma (y^2)$	0.09	20.19	0.01	279.85	588.98
$\Sigma (\Sigma Y)^2$	889.13				
$\Sigma (\Sigma Y)^2/n$	870.00				
GrandTotal ² /an	407.16				
SStotal	481.96				
SSgroup	462.84				
SSwithin	19.12				
ANOVA Table	a= 5.00		n= 3.00		F[0.05(4,10)]= 3.48
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	462.84	115.71	60.50 P≤0.05	
Within Groups	10.00	19.12	1.91		
Total	14.00	481.96			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	462.84	4.00	115.71	60.50 P≤0.05	F[0.05(4,10)]= 3.48
Killed vs Biological	257.03	1.00	257.03	134.40 P≤0.05	F[0.05(1,10)]= 4.96
Untreated vs Biological	580.89	1.00	580.89	303.74 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs Indigenous	17.69	1.00	17.69	9.25 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs GW	17.75	1.00	17.75	9.28 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs Soil	17.76	1.00	17.76	9.29 P≤0.05	F[0.05(1,10)]= 4.96
GW vs Soil	0.07	1.00	0.07	0.04 ns	F[0.05(1,10)]= 4.96
Untreated vs Killed	323.86	1.00	323.86	169.34 P≤0.05	F[0.05(1,10)]= 4.96
Within	19.12	10.00	1.91		
Total	481.96	14			

Table 12

**ANOVA and Comparisons Among Means Based on EPA CLP Data
L.E. Carpenter and Co., IT Project No. 408474**

Ethylbenzene	GW+Nuts	GW+Sludge+Nuts	GW+Soil+Nuts	GW+HgCl+Nuts	Zero Headspace
	0	0	0	6.5	14
	0	0	0	3.6	15
	0	0	0	7.5	15
Σy	0.00	0.00	0.00	17.60	44.00
mean y	0.00	0.00	0.00	5.87	14.67
$\Sigma \Sigma Y$	61.60				
$\Sigma (y^2)$	0.00	0.00	0.00	111.46	646.00
$\Sigma (\Sigma Y)^2$	757.46				
$\Sigma (\Sigma Y)^2/n$	748.59				
GrandTotal ² /an	252.97				
SStotal	504.49				
SSgroup	495.62				
SSwithin	8.87				
ANOVA Table	a= 5.00		n= 3.00		F[0.05(4,10)]= 3.48
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	495.62	123.90	139.64	P≤0.05
Within Groups	10.00	8.87	0.89		
Total	14.00	504.49			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	495.62	4.00	123.90	139.64	P≤0.05 F[0.05(4,10)]= 3.48
Killed vs Biological	103.25	1.00	103.25	116.36	P≤0.05 F[0.05(1,10)]= 4.96
Untreated vs Biological	645.33	1.00	645.33	727.27	P≤0.05 F[0.05(1,10)]= 4.96
Sludge vs Indigenous	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Sludge vs GW	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Sludge vs Soil	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
GW vs Soil	0.00	1.00	0.00	0.00	ns F[0.05(1,10)]= 4.96
Untreated vs Killed	542.08	1.00	542.08	610.91	P≤0.05 F[0.05(1,10)]= 4.96
Within	8.87	10.00	0.89		
Total	504.49	14			

Table 12. Page 2 of 3

Xylene	GW+Nuts	GW+Sludge+Nuts	GW+Soil+Nuts	GW+HgCl+Nuts	Zero Headspace
	0	0	0	5.1	15.8
	0	0	0	3.55	15.9
	0	0	0	9.39	26.9
Σy	0.00	0.00	0.00	18.04	58.60
mean y	0.00	0.00	0.00	6.01	19.53
$\Sigma \Sigma Y$	76.64				
$\Sigma (y^2)$	0.00	0.00	0.00	126.78	1226.06
$\Sigma (\Sigma Y)^2$	1352.84				
$\Sigma (\Sigma Y)^2/n$	1253.13				
GrandTotal ² /an	391.58				
SStotal	961.27				
SSgroup	861.55				
SSwithin	99.71				
ANOVA Table	a= 5.00		n= 3.00		F[0.05(4,10)]= 3.48
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	861.55	215.39	21.60 P≤0.05	
Within Groups	10.00	99.71	9.97		
Total	14.00	961.27			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	861.55	4.00	215.39	21.60 P≤0.05	F[0.05(4,10)]= 3.48
Killed vs Biological	108.48	1.00	108.48	10.88 P≤0.05	F[0.05(1,10)]= 4.96
Untreated vs Biological	1144.65	1.00	1144.65	114.80 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs Indigenous	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Sludge vs GW	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Sludge vs Soil	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
GW vs Soil	0.00	1.00	0.00	0.00 ns	F[0.05(1,10)]= 4.96
Untreated vs Killed	1036.17	1.00	1036.17	103.92 P≤0.05	F[0.05(1,10)]= 4.96
Within	99.71	10.00	9.97		
Total	961.27	14			

Table 12. Page 3 of 3

DEHP	GW+Nuts	GW+Sludge+Nuts	GW+Soil+Nuts	GW+HgCl+Nuts	Zero Headspace
	0.11	1.8	0.15	11	4.2
	0.2	1	0.86	3.4	5
	0.18	1.9	0.27	3.4	9.2
Σy	0.49	4.70	1.28	17.80	18.40
mean y	0.16	1.57	0.43	5.93	6.13
$\Sigma \Sigma Y$	42.67				
$\Sigma (y^2)$	0.08	7.85	0.84	144.12	127.28
$\Sigma (\Sigma Y)^2$	280.17				
$\Sigma (\Sigma Y)^2/n$	226.46				
GrandTotal ² /an	121.38				
SStotal	158.79				
SSgroup	105.07				
SSwithin	53.71				
ANOVA Table	a= 5.00		n= 3.00		F[0.05(4,10)]= 3.48
Source of Variation	df	SS	MS	Fs	
Among Groups	4.00	105.07	26.27	4.89 P≤0.05	
Within Groups	10.00	53.71	5.37		
Total	14.00	158.79			
Comparisons, Planned					
Source of variation	SS	df	MS	Fs	
Treatments	105.07	4.00	26.27	4.89 P≤0.05	F[0.05(4,10)]= 3.48
Killed vs Biological	100.96	1.00	100.96	18.80 P≤0.05	F[0.05(1,10)]= 4.96
Untreated vs Biological	108.20	1.00	108.20	20.14 P≤0.05	F[0.05(1,10)]= 4.96
Sludge vs Indigenous	7.11	1.00	7.11	1.32 ns	F[0.05(1,10)]= 4.96
Sludge vs GW	7.35	1.00	7.35	1.37 ns	F[0.05(1,10)]= 4.96
Sludge vs Soil	7.30	1.00	7.30	1.36 ns	F[0.05(1,10)]= 4.96
GW vs Soil	-0.47	1.00	-0.47	-0.09 ns	F[0.05(1,10)]= 4.96
Untreated vs Killed	7.24	1.00	7.24	1.35 ns	F[0.05(1,10)]= 4.96
Within	53.71	10.00	5.37		
Total	158.79	14			

Table 13
Respiration and Mineralization of Organic Carbon
L. E. Carpenter, IT Project No. 408474

Parameter	Treatment				
	GW & Ntr (1)	GW, Sludge & Ntr (2)	GW, Soil & Ntr (3)	GW, HgCl & Ntr (4)	Zero Head Space (5)
Total Oxygen Consumed (mg/L)	397	1344	474	13	ND
TIC Evolved (mg C/L)	117	220	140	64	ND
TIC Initial (mg C/L)	56	57	58	57	57
TIC Generated (mg C/L)(Evolved-Initial	61	164	82	7	ND
TOC Consumed (mg C/L)	55	36	62	NA	0
Expected O2 based on TIC (mg/L)	325	874	437	25	ND
Expected O2 based on TOC (mg/L)	293	194	329	NA	ND

NA, not applicable

ND, not determined

Table 14
Cross Reference Chart for Soil Samples and Tests

Split Spoon Sample Number	Shelby Tube Depth	Type of Testing	Initial Phthalate Analysis
ST-1A	12 to 36	Not Used	No
ST-1A	36 to 60	Not Used	No
ST-1B	12 to 36	Not Used	No
ST-1B	36 to 60	Not Used	No
ST-2A	24 to 48	Geotechnical	No
ST-2A	48 to 72	Geotechnical	No
ST-2A	72 to 96	Soil Flushing	Yes
ST-2B	24 to 48	Geotechnical	No
ST-2B	48 to 72	Not Used	Yes
ST-2B	72 to 96	Geotechnical	No
ST-3A	0 to 24	Geotechnical	No
ST-3A	24 to 48	Soil Flushing	Yes
ST-3B	0 to 24	Not Used	Yes
ST-3B	24 to 48	Geotechnical	No
ST-4A	12 to 36	Not Used	No
ST-4B	12 to 36	Not Used	No
ST-4C	12 to 36	Not Used	No
ST-4D	12 to 36	Soil Flushing	Yes

Table 15
Geotechnical Characteristics of Selected Soil Cores

Sample Number	ST-2A	ST-2A	ST-2B	ST-2B	ST-3A	ST-3B
Sample Depth (inches)	24-48	48-72	24-48	72-96	0-24	24-48
Water Content (%)	6.5	15.1	6.6	5.6	10.2	40.2
Average Specific Gravity (g/cc)	2.82	2.56	2.95	2.83	2.63	2.51
Organic Content (%)	5.3	8.0	4.2	3.8	3.4	4.3
Ash Content (%)	94.7	92.0	95.8	96.2	96.6	95.7
Porosity	34.6	67.1	49.3	43.3	38.5	46.8
Liquid Limit	26.0	30.0	24.0	23.0	20.0	30.0
Plasticity Index	2.0	NP	NP	1.0	3.0	NP
Permeability (cm/s)	5.1 E-5	1.8 E-5	1.1 E-4	1.4 E-4	3.3 E-5	5.6 E-6
Unit Weight Density (g/cc)	1.97	0.97	1.60	1.70	1.78	1.88
Dry Density (g/cc)	1.85	0.84	1.50	1.61	1.62	1.34
Total Organic Carbon (mg/kg)	18000	2300	3300	3500	4100	7000

NP denotes nonplastic

Table 16
Geotechnical Characteristics of Soil Samples Used in the Study

Cell Number	Soil Weight g	Soil Volume cc	Bulk Density g/cc	Volume of Solids cc	Volume of Voids cc	Void Ratio	Pore Volume %
Cell 1	520.13	246.5	2.11	192.6	53.9	0.28	21.8
Cell 2	358.81	280.8	1.28	132.9	147.9	1.11	52.7
Cell 3	491.50	335.7	1.46	182.0	153.7	0.84	45.8
Cell 4	535.45	323.3	1.66	198.3	125.0	0.63	38.7

All calculations based on oven dry weight basis
 Specific gravity estimated at 2.7 g/cc

Table 17
Concentration of Analytes in Initial Soil Samples
Used in the Soil Flushing Study

Cell Number	Cell 1	Cell 2/3	Cell 4
Sample Identification	ST-2A	ST-3A	ST-4D
Sample Depth (inches)	72 to 96	24 to 48	12 to 36
Chemical Analytes	ug/kg	ug/kg	ug/kg
Volatile Organic Compounds			
Ethyl benzene	130000	-	-
4-methyloctane	11000	-	-
Total xylenes	570000	11	2.2
2,5-dimethylnonane	26000	-	-
Propylcyclohexane	40000	-	-
Ethylmethylbenzene	22000	-	-
2-methylnonane	35000	-	-
Total cyclohexanes	-	246.8	-
Semivolatile Organic Compounds			
Butylbenzylphthalate	1600	380	1500
Bis(2-ethylhexyl)phthalate	1900000	650000	840000
Di-n-butylphthalate	11000	250	31000
Diethyl phthalate	1600	-	3700
Dimethyl phthalate	380	-	760
Di-n-octyl phthalate	4700	1400	3000
Total phthalates (additional)	69000	16800	137000
Anthracene	-	-	340
Benzo(a)anthracene	-	-	850
Benzo(b)fluoranthene	-	-	640
Benzo(k)fluoranthene	-	-	770
Benzo(a)pyrene	-	-	720
Chrysene	-	-	890
Fluoranthene	-	-	1500
Indeno(1,2,3-cd)pyrene	-	-	380
Naphthalene	-	-	230
Phenanthrene	-	-	1000
Pyrene	-	-	1200
Dibenz(a,h)anthracene	-	-	250
4-Hydroxy-4-methyl-2-pentanone	14000	14000	14000
2-Methyl-1-(1,1-dimethylethyl)-2-met propanoic acid	16000	22000	5700
Hexadecanoic acid	6700	1000	5700
2-Ethylhexyl diphenyl ester phosphoric acid	55000	8400	56000
2-Methylpropyl ester octadecanoic acid	9600	-	9000
Total alkanes	274400	1400	233800

Table 18
Leachate Volumes Collected During the Soil Flushing Study for Phase I

Sample Period	1	2	3	4	5	6	7	8	9	10
Date	26-Mar	30-Mar	3-Apr	6-Apr	10-Apr	11-Apr	13-Apr	15-Apr	18-Apr	21-Apr
Days	4	8	12	15	19	20	22	24	27	30
Individual	mL	mL	mL	mL	mL	mL	mL	mL	mL	mL
Cell 1	2329	3245	3588	3045	3181	1027	3322	3047	2851	2962
Cell 2	2256	3145	3186	2904	3105	1001	3209	2950	2764	2861
Cell 3	2293	3260	3315	3085	3198	1041	3280	3030	2836	2952
Cell 4	2232	3076	3131	2937	3055	1003	3019	2902	2731	2840
Accumulative										
Cell 1	2329	5575	9163	12208	15389	16416	19738	22785	25636	28593
Cell 2	2256	5401	8587	11491	14596	15596	18806	21755	24519	27380
Cell 3	2293	5552	8867	11952	15150	16191	19471	22501	25336	28283
Cell 4	2232	5308	8440	11376	14432	15434	18453	21355	24086	26926

Table 19
Leachate Volumes Collected During the Soil Flushing Study for Phase II

Sample Period	1a	2	3	4	5	6	7	8	9	10
Date	29-Apr	2-May	5-May	8-May	11-May	14-May	18-May	21-May	25-May	28-May
Days	4	3	6	9	12	15	19	22	26	29
Individual	mL	mL	mL	mL	mL	mL	mL	mL	mL	mL
Cell 1	3358	3090	1677	2952	3002	3016	3368	3023	3247	3042
Cell 2	3283	2943	2830	2779	2826	2838	3270	2883	3185	2996
Cell 3	3100	2999	2878	2837	2877	2892	3325	2892	3229	3037
Cell 4	3208	2926	2814	2778	2803	2821	3197	2786	3159	2947
Accumulative										
Days		3	6	9	12	15	19	22	26	29
Cell 1		3090	4767	7719	10721	13737	17105	20128	23374	26416
Cell 2		2943	5773	8552	11378	14216	17486	20369	23554	26550
Cell 3		2999	5877	8713	11591	14483	17807	20699	23928	26965
Cell 4		2926	5740	8518	11321	14142	17339	20125	23283	26230

a - denotes that leachate volume was not calculated into accumulative values

Table 20
Concentration of VOCs and SVOCs in Cell 1 Leachates

Chemical Analyte	Phase I			Phase II		
	Period 1	Period 2	Composite	Period 3	Period 4	Composite
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds						
Benzene	110	32	3	-	16	-
Ethyl benzene	1700	-	4	1800	260	-
Toluene	320	40	5	-	26	-
Total xylenes	7500	-	-	-	-	-
Semivolatile Organic Compounds						
Butylbenzylphthalate	-	-	-	540	-	-
Bis(2-ethylhexyl)phthalate	-	-	-	61000	3200	6500
Di-n-butylphthalate	20	-	-	-	-	-
Diethyl phthalate	86	-	-	-	-	-
Dimethyl phthalate	26	-	-	-	-	-
Di-n-octyl phthalate	-	-	-	190	-	24
Total phthalates (additional)	-	-	-	-	-	-
LEACHATE VOLUME (L)	2.329	2.962	28.598	3.09	3.042	26.416

Table 21
Concentration of VOCs and SVOCs in Cell 2 Leachates

Chemical Analyte	Phase I			Phase II		
	Period 1	Period 2	Composite	Period 3	Period 4	Composite
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds						
Benzene	120	4	3	7	6	6
Ethyl benzene	71	-	4	-	-	3
Toluene	310	5	5	18	16	14
Total xylenes	840	-	-	-	-	-
Semivolatile Organic Compounds						
Butylbenzylphthalate	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-
Di-n-butylphthalate	-	-	-	-	-	-
Diethyl phthalate	11	-	-	-	2	-
Dimethyl phthalate	-	-	-	-	-	-
Di-n-octyl phthalate	-	-	-	-	-	-
Total phthalates (additional)	-	-	-	-	-	-
LEACHATE VOLUME (L)	2.256	2.861	27.38	3.283	2.996	26.55

Table 22
Concentration of VOCs and SVOCs in Cell 3 Leachates

Chemical Analyte	Phase I			Phase II		
	Period 1	Period 2	Composite	Period 3	Period 4	Composite
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds						
Benzene	48	3	3	-	2	-
Ethyl benzene	4	-	2	-	3	-
Toluene	100	3	5	-	3	-
Total xylenes	410	-	-	-	-	-
Semivolatile Organic Compounds						
Butylbenzylphthalate	-	-	2	-	-	6
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-
Di-n-butylphthalate	-	-	-	-	-	-
Diethyl phthalate	12	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-	-
Di-n-octyl phthalate	-	-	-	-	-	-
Total phthalates (additional)	-	-	-	-	-	-
LEACHATE VOLUME (L)	2.293	2.952	28.288	3.1	3.037	26.965

Table 23
Concentration of VOCs and SVOCs in Cell 4 Leachates

Chemical Analyter	Phase I			Phase II		
	Period 1	Period 2	Composite	Period 3	Period 4	Composite
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Organic Compounds						
Benzene	10	-	-	-	15	13
Ethyl benzene	-	-	1	-	-	-
Toluene	2	-	2	-	21	20
Total xylenes	64	-	-	-	-	-
Semivolatile Organic Compounds						
Butylbenzylphthalate	-	-	-	190	-	-
Bis(2-ethylhexyl)phthalate	-	-	-	490	360	38
Di-n-butylphthalate	-	-	-	-	-	-
Diethyl phthalate	2	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-	-
Di-n-octyl phthalate	-	-	-	-	-	-
Total phthalates (additional)	-	-	-	-	-	-
LEACHATE VOLUME (L)	2.232	2.84	26.926	3.208	2.947	26.23

Table 24
Concentration of Analytes in Final Soil Samples
Used in the Soil Flushing Study

Cell Number	Cell 1	Cell 2	Cell 3	Cell 4
Sample Identification	ST-2A	ST-3A	ST-3A	ST-4D
Sample Depth (inches)	72 to 96	24 to 48	24 to 48	12 to 36
Chemical Analyte	ug/kg	ug/kg	ug/kg	ug/kg
Volatile Organic Compounds				
Ethyl benzene	29000	-	-	9
4-methyloctane	-	-	-	-
Total xylenes	-	-	-	-
2,5-dimethylnonane	-	-	-	-
Propylcyclohexane	-	-	-	-
Ethylmethylbenzene	-	-	-	-
2-methylnonane	-	-	-	-
Total cyclohexanes	-	-	-	-
Semivolatile Organic Compounds				
Butylbenzylphthalate	1800	-	-	600
Bis(2-ethylhexyl)phthalate	110000	20000	11000	310000
Di-n-butylphthalate	600	-	-	-
Diethyl phthalate	-	-	-	-
Dimethyl phthalate	-	-	-	-
Di-n-octyl phthalate	2500	310	440	1100
Total phthalates (additional)	-	-	-	-
Anthracene	-	-	-	-
Benzo(a)anthracene	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-
Benzo(k)fluoranthene	-	-	-	-
Benzo(a)pyrene	-	-	120	-
Chrysene	-	-	-	-
Fluoranthene	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	-	-
Naphthalene	-	-	-	-
Phenanthrene	-	-	-	-
Pyrene	-	-	-	-
Dibenz(a,h)anthracene	-	-	-	-
4-Hydroxy-4-methyl-2-pentanone	-	-	-	-
Hexadecanoic acid	-	-	-	-
2-Ethylhexyl diphenyl ester phosphoric acid	-	-	-	-
2-Methylpropyl ester octadecanoic acid	-	-	-	-
Total alkanes	-	-	-	-

Table 25
Total Amount of VOCs and SVOCs in Cell 1 Leachates

Chemical Analyte	Phase I			Phase II			Phase I	Phase II
	Period 1	Period 2	Composite	Period 3	Period 4	Composite	SUM	SUM
	ug	ug	ug	ug	ug	ug	ug	ug
Volatile Organic Compounds								
Benzene	256	95	86	-	49	-	437	49
Ethyl benzene	3959	-	114	5562	791	-	4074	6353
Toluene	745	118	143	-	79	-	1007	79
Total xylenes	17468	-	-	-	-	-	17468	0
Semivolatile Organic Compounds								
Butylbenzylphthalate	-	-	-	1669	-	-	0	1669
Bis(2-ethylhexyl)phthalate	-	-	-	188490	9734	171704	0	369928
Di-n-butylphthalate	47	-	-	-	-	-	47	0
Diethyl phthalate	200	-	-	-	-	-	200	0
Dimethyl phthalate	61	-	-	-	-	-	61	0
Di-n-octyl phthalate	-	-	-	587	-	634	0	1221
Total phthalates (additional)	-	-	-	-	-	-	0	0

Table 26
Total Amount of VOCs and SVOCs in Cell 2 Leachates

CHEMICAL ANALYTE	Phase I			Phase II			Phase I	Phase II
	Period 1	Period 2	Composite	Period 3	Period 4	Composite	SUM	SUM
	ug	ug	ug	ug	ug	ug	ug	ug
Volatile Organic Compounds								
Benzene	271	11	82	23	18	159	364	200
Ethyl benzene	160	-	110	-	-	80	270	80
Toluene	699	14	137	59	48	372	850	479
Total xylenes	1895	-	-	-	-	-	1895	0
Semivolatile Organic Compounds								
Butylbenzylphthalate	-	-	-	-	-	-	0	0
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0	0
Di-n-butylphthalate	-	-	-	-	-	-	0	0
Diethyl phthalate	25	-	-	-	6	-	25	6
Dimethyl phthalate	-	-	-	-	-	-	0	0
Di-n-octyl phthalate	-	-	-	-	-	-	0	0
Total phthalates (additional)	-	-	-	-	-	-	0	0

Table 27
Total Amount of VOCs and SVOCs in Cell 3 Leachates

CHEMICAL ANALYTE	Phase I			Phase II			Phase I	Phase II
	Period 1	Period 2	Composite	Period 3	Period 4	Composite	SUM	SUM
	ug	ug	ug	ug	ug	ug	ug	ug
Volatile Organic Compounds								
Benzene	110	9	85	-	6	-	204	6
Ethyl benzene	9	-	57	-	9	-	66	9
Toluene	229	9	141	-	9	-	380	9
Total xylenes	940	-	-	-	-	-	940	0
Semivolatile Organic Compounds								
Butylbenzylphthalate	-	-	57	-	-	162	57	162
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0	0
Di-n-butylphthalate	-	-	-	-	-	-	0	0
Diethyl phthalate	28	-	-	-	-	-	28	0
Dimethyl phthalate	-	-	-	-	-	-	0	0
Di-n-octyl phthalate	-	-	-	-	-	-	0	0
Total phthalates (additional)	-	-	-	-	-	-	0	0

Table 28
Total Amount of VOCs and SVOCs in Cell 4 Leachates

Chemical Analyte	Phase I			Phase II			Phase I	Phase II
	Period 1	Period 2	Composite	Period 3	Period 4	Composite	SUM	SUM
	ug	ug	ug	ug	ug	ug	ug	ug
Volatile Organic Compounds								
Benzene	22	-	-	-	44	341	22	385
Ethyl benzene	-	-	27	-	-	-	27	0
Toluene	4	-	54	-	62	525	58	586
Total xylenes	143	-	-	-	-	-	143	0
Semivolatile Organic Compounds								
Butylbenzylphthalate	-	-	-	610	-	-	0	610
Bis(2-ethylhexyl)phthalate	-	-	-	1572	1061	997	0	3630
Di-n-butylphthalate	-	-	-	-	-	-	0	0
Diethyl phthalate	4	-	-	-	-	-	4	0
Dimethyl phthalate	-	-	-	-	-	-	0	0
Di-n-octyl phthalate	-	-	-	-	-	-	0	0
Total phthalates (additional)	-	-	-	-	-	-	0	0

* denotes analyte was found in flushing solution

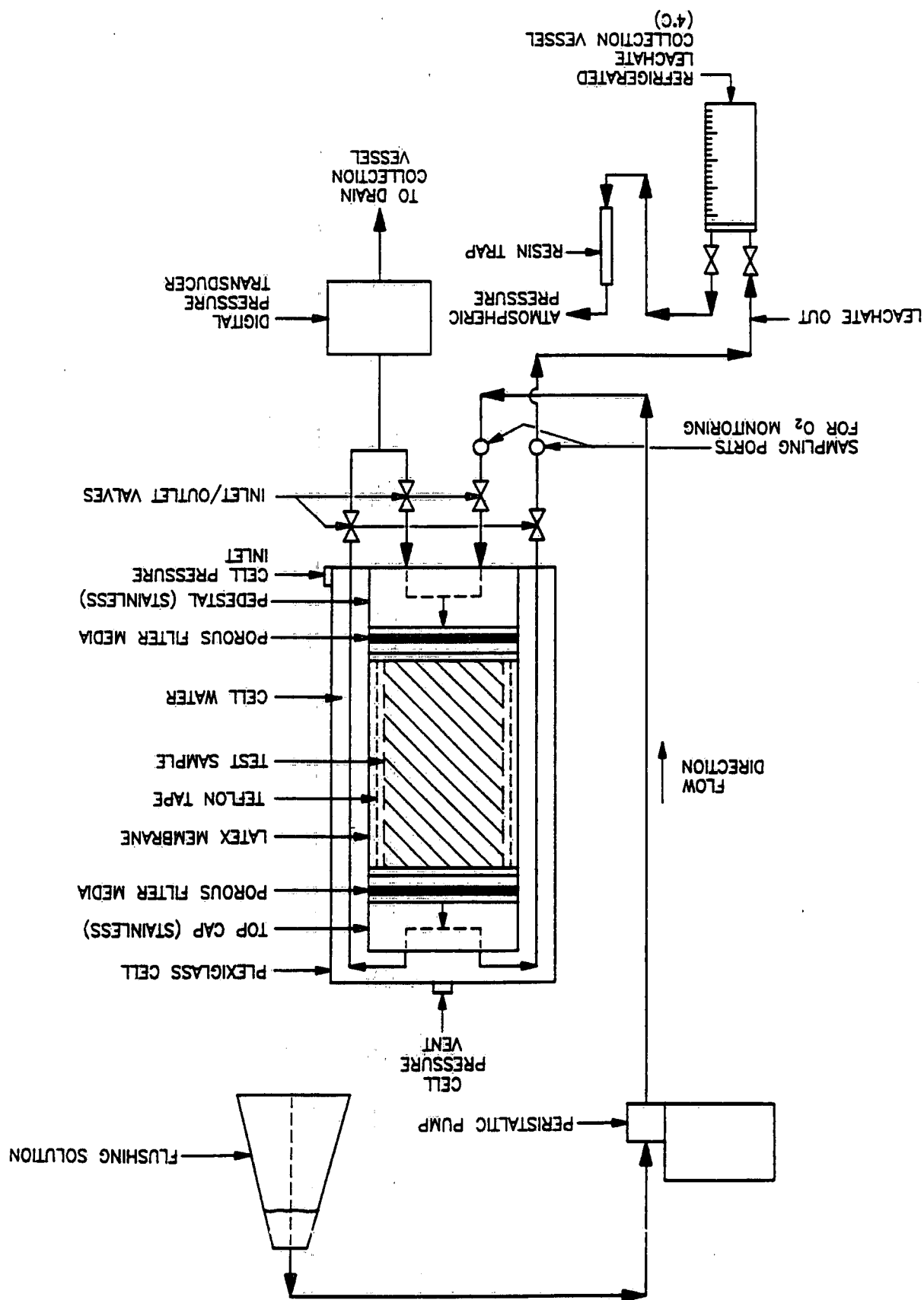
Table 29
Total Percent and Amount of Contaminants Removed From Soils During Flushing

Chemical Analyte	Cell 1				Cell 2			
	Phase I %ug	Phase II %ug	Tenax %ug	Soil ug	Phase I %ug	Phase II %ug	Tenax %ug	Soil ug
VOCs								
Benzene	81\437	9\49	10\54	0	52\364	29\200	19\130	0
Ethyl benzene	16\4074	24\6353	2\430	15083	66\270	19\80	15\62	0
Toluene	82\1007	6\79	11\140	0	50\850	28\479	21\360	0
Total xylenes	100\17468	0\0	0\0	0	100\1895	0\0	0\0	0
SVOCs								
Butylbenzylphthalate	0\0	64\1669	-	936	0\0	0\0	-	0
Bis(2-ethylhexyl)phthalate	0\0	87\369928	-	57211	0\0	0\0	-	7176
Di-n-butylphthalate	13\47	0\0	-	312	0\0	0\0	-	0
Diethyl phthalate	100\200	0\0	-	0	81\25	19\6	-	0
Dimethyl phthalate	100\61	0\0	-	0	0\0	0\0	-	0
Di-n-octyl phthalate	0\0	48\1221	-	1300	0\0	0\0	-	111
Total phthalates (additional)	0\0	0\0	-	0	0\0	0\0	-	0

Table 29 (cont.)
Total Percent and Amount of Contaminants Removed From Soils During Flushing

Chemical Analyte	Cell 3				Cell 4			
	Phase I	Phase II	Tenax	Soil	Phase I	Phase II	Tenax	Soil
	%\ug	%\ug	%\ug	ug	%\ug	%\ug	%\ug	ug
VOCs								
Benzene	71\204	2\6	27\79	0	5\22	93\385	1\6	1
Ethyl benzene	63\66	9\9	29\30	0	73\27	0\0	27\10	0
Toluene	60\380	1\9	38\240	0	9\58	89\586	2\11	1
Total xylenes	100\940	0\0	0\0	0	100\143	0\0	0\0	0
SVOCs								
Butylbenzylphthalate	26\57	74\162	-	0	0\0	66\610	-	321
Bis(2-ethylhexyl)phthalate	0\0	0\0	-	5407	0\0	2\3630	-	165990
Di-n-butylphthalate	0\0	0\0	-	0	0\0	0\0	-	0
Diethyl phthalate	100\28	0\0	-	0	100\4	0\0	-	0
Dimethyl phthalate	0\0	0\0	-	0	0\0	0\0	-	0
Di-n-octyl phthalate	0\0	0\0	-	216	0\0	0\0	-	589
Total phthalates (additional)	0\0	0\0	-	0	0\0	0\0	-	0

FIGURE 1. FLEXIBLE WALL PERMEAMETER



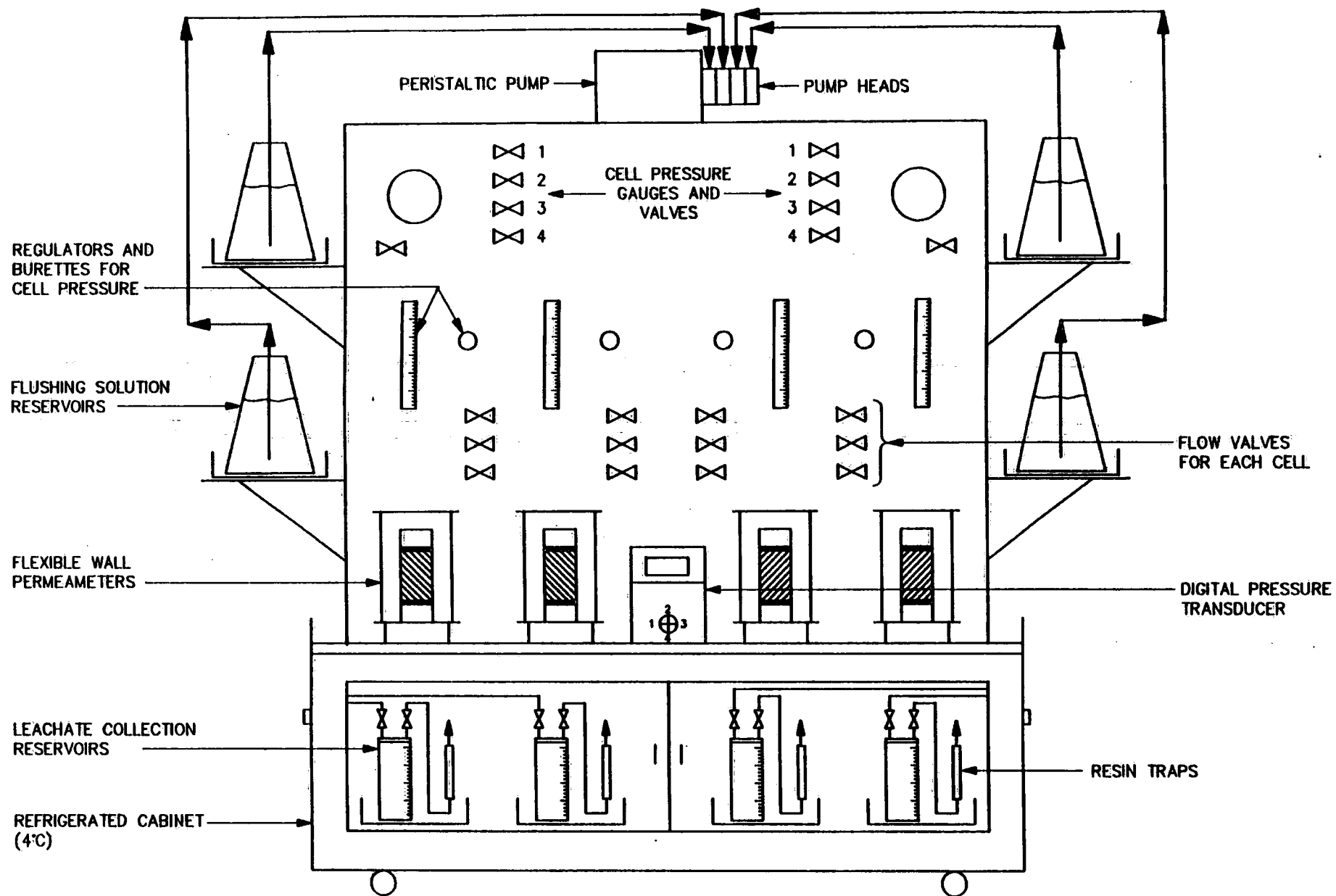


FIGURE 2. BENCHSCALE SOIL FLUSHING SYSTEM

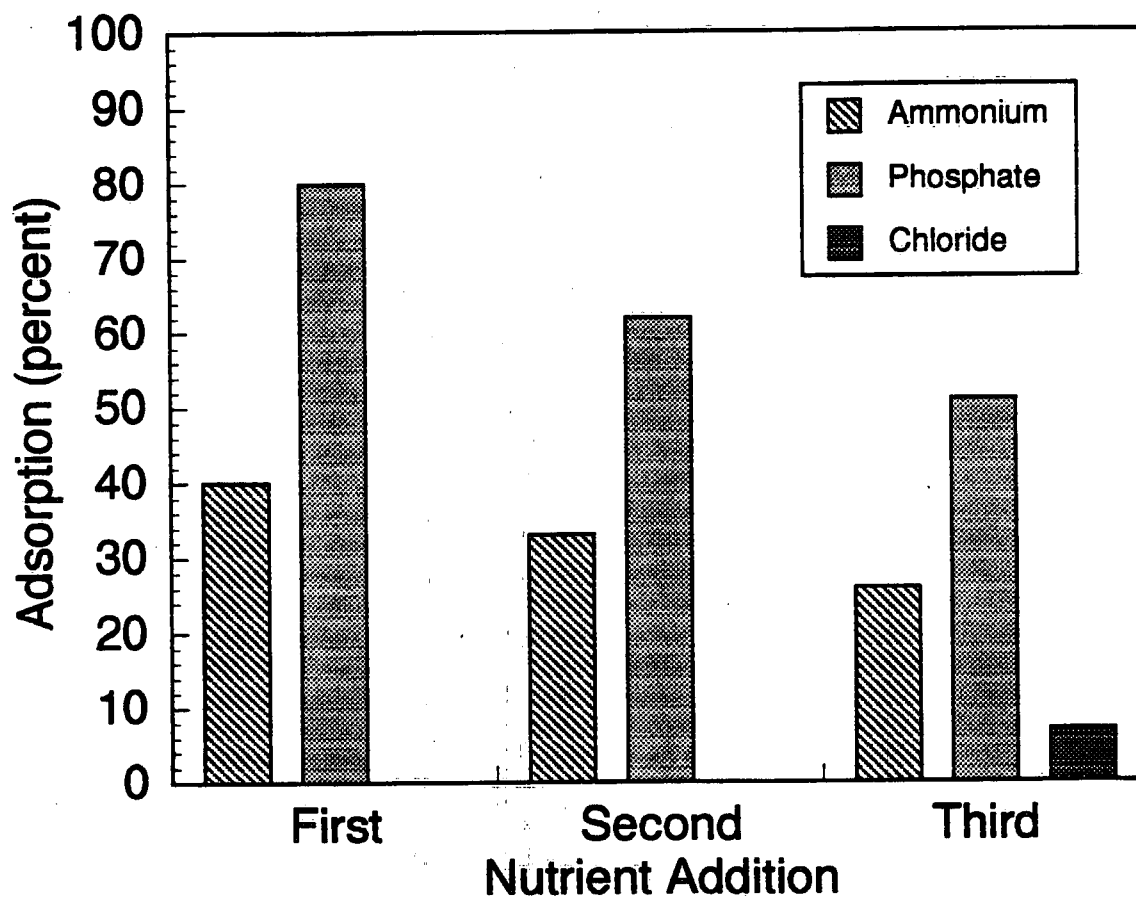


Figure 3

Nutrient adsorption. Nutrients were added to a 9 parts water and 1 part soil slurry as three spikes with measurement of adsorption performed after 24 hours of incubation following each spike.

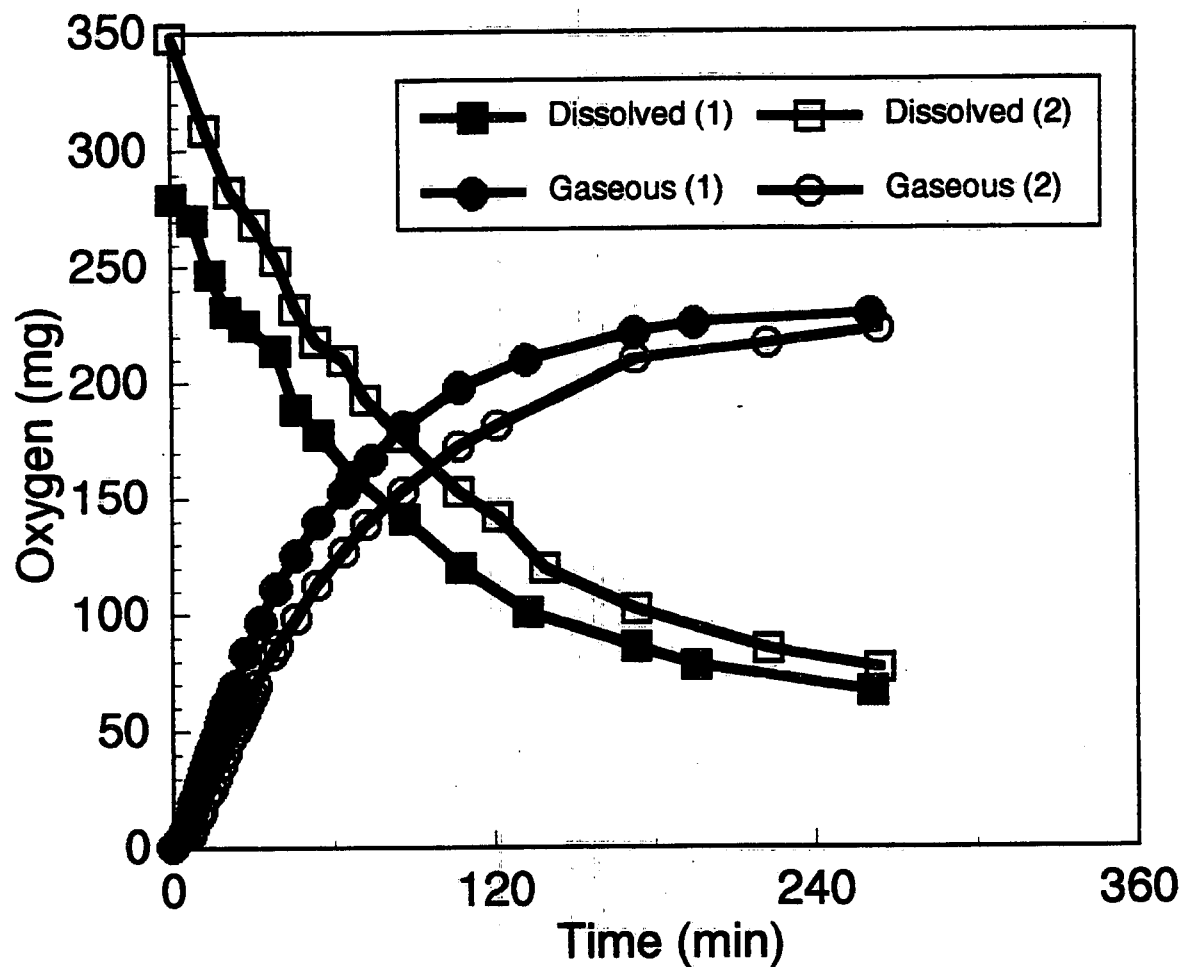


Figure 4

Oxygen delivery potential. The decomposition of hydrogen peroxide into gaseous oxygen and the corresponding residual total soluble oxygen including dissolved oxygen and hydrogen peroxide was measured.

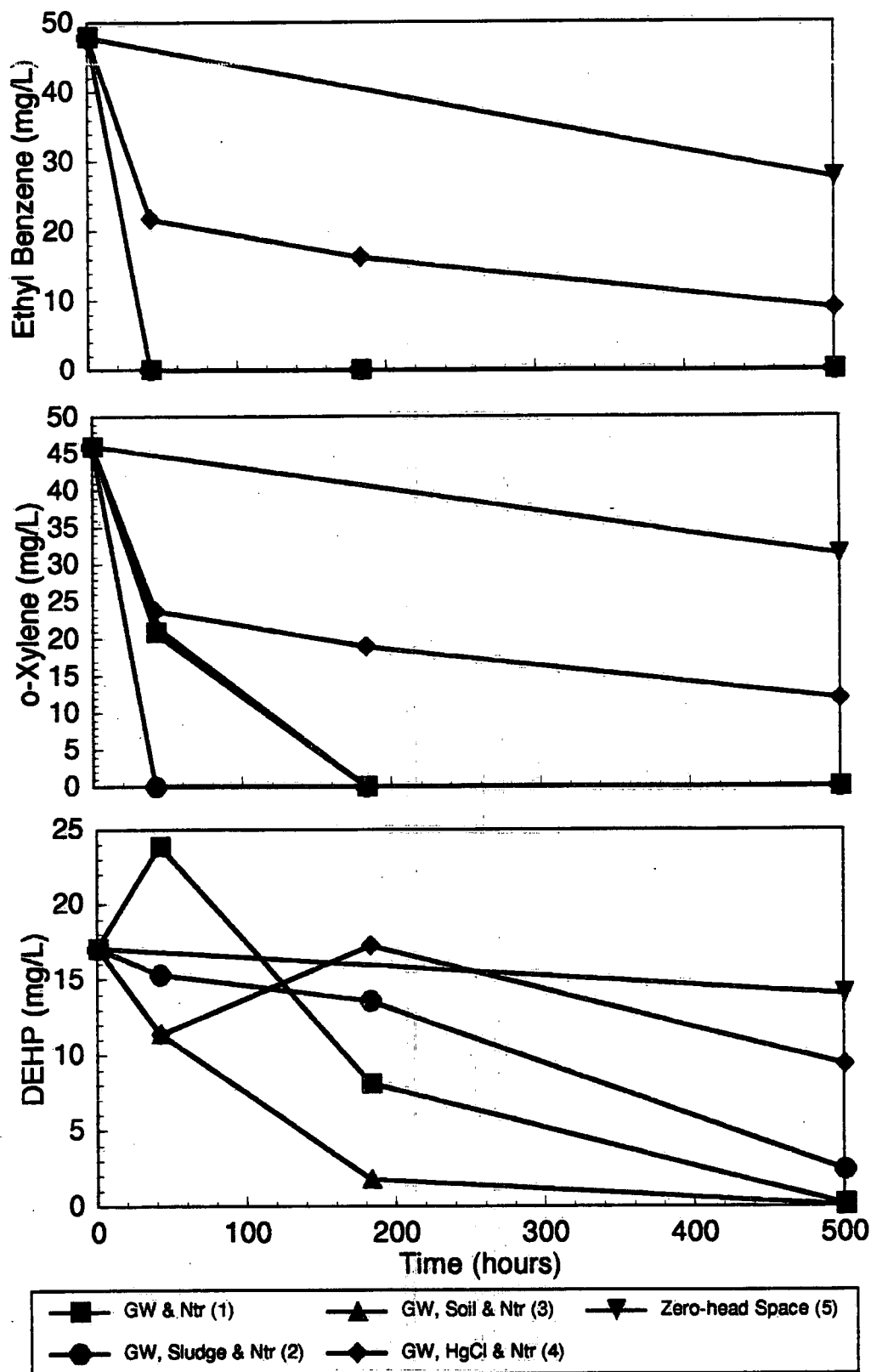
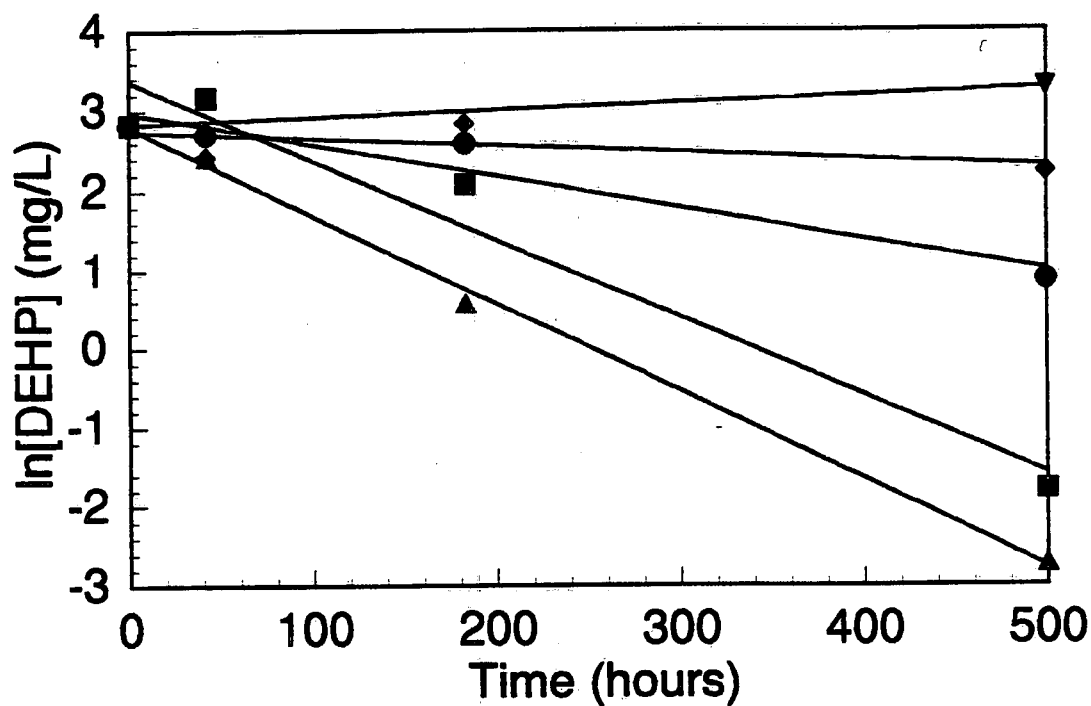


Figure 5

**Ethyl Benzene, xylene, and DEHP removal from groundwater batch treatability tests.
L. E. Carpenter, IT Project No. 408474**



- GW & Ntr: $k = -9.898\text{E-}3 \text{ hrs}^{-1}$, $t_{1/2} = 70 \text{ hours}$
- GW, Sludge & Ntr: $k = -3.933\text{E-}3 \text{ hrs}^{-1}$, $t_{1/2} = 176 \text{ hours}$
- ▲ GW, Soil & Ntr: $k = -1.115\text{E-}2 \text{ hrs}^{-1}$, $t_{1/2} = 62 \text{ hours}$
- ◆ GW, HgCl & Ntr: $k = -8.668\text{E-}4 \text{ hrs}^{-1}$, $t_{1/2} = 800 \text{ hours}$
- ▼ Zero Head Space: infinite

Figure 6
Biodegradation kinetic constants and half lives
for DEHP in each batch treatment.

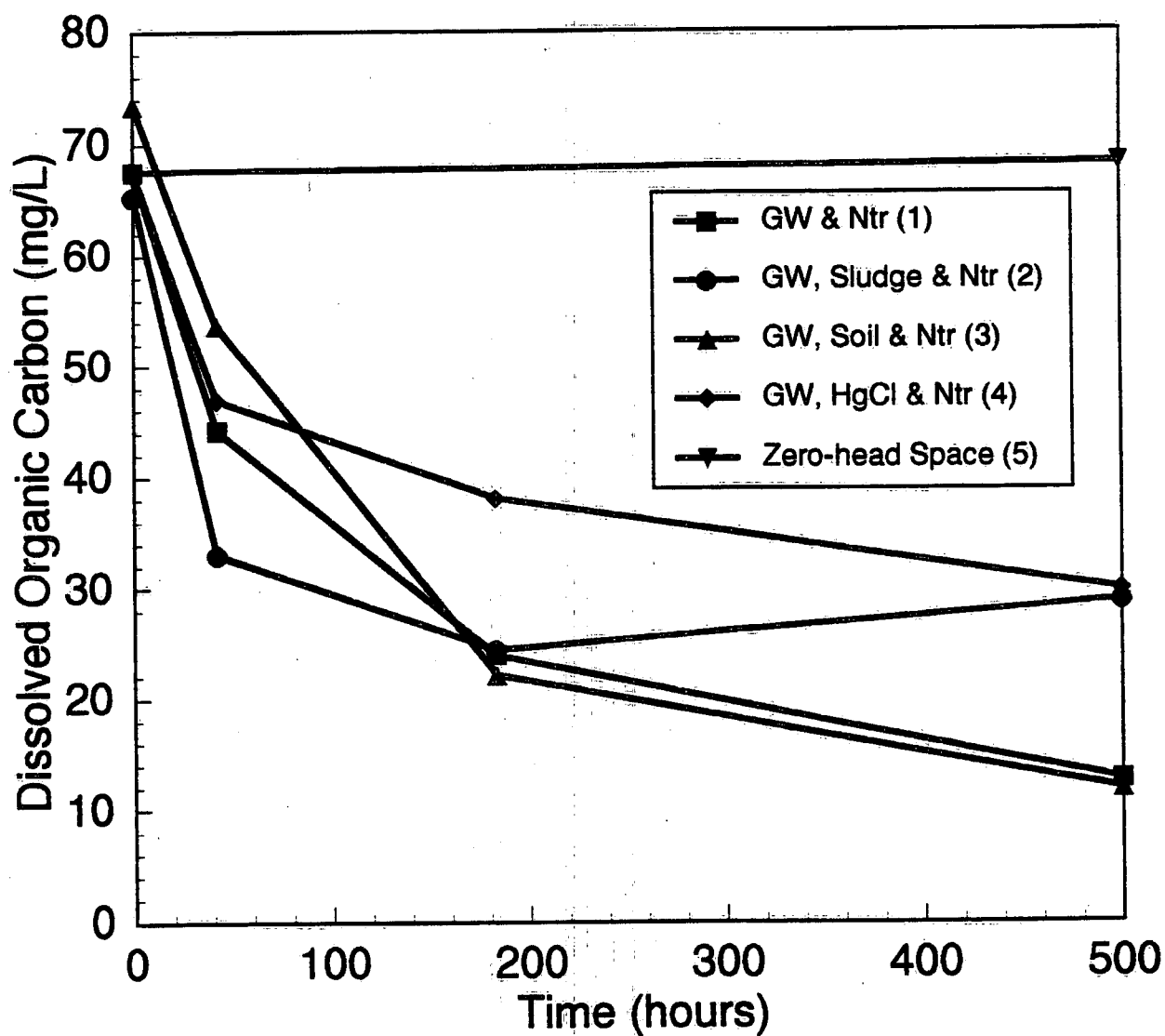


Figure 7

Mean dissolved organic carbon content of groundwater during batch treatment.

L. E. Carpenter and Co. IT Project No. 408474.

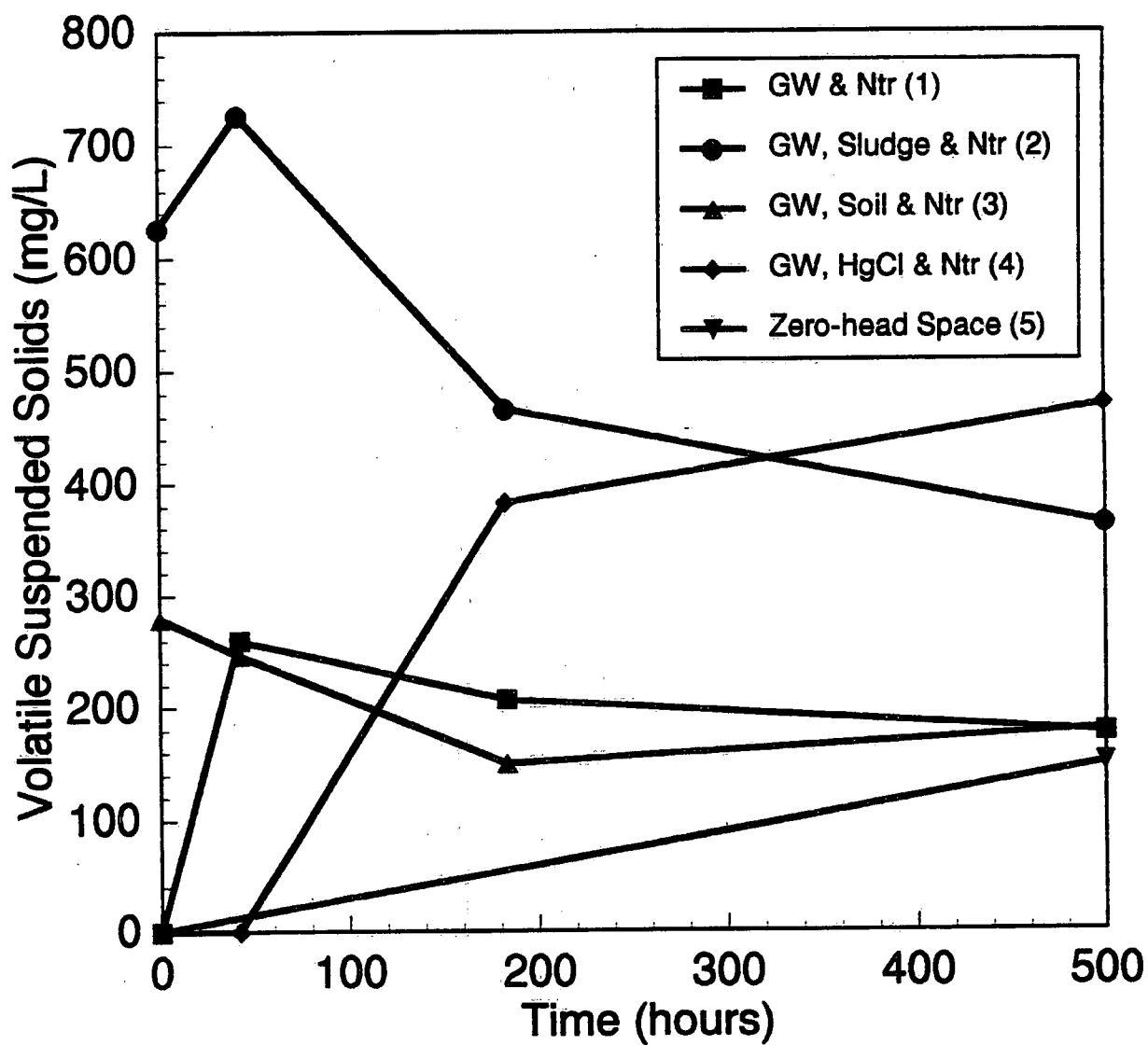


Figure 8

Mean volatile suspended solids analysis of groundwater treatments.

L. E. Carpenter and Co. IT Project No. 408474.

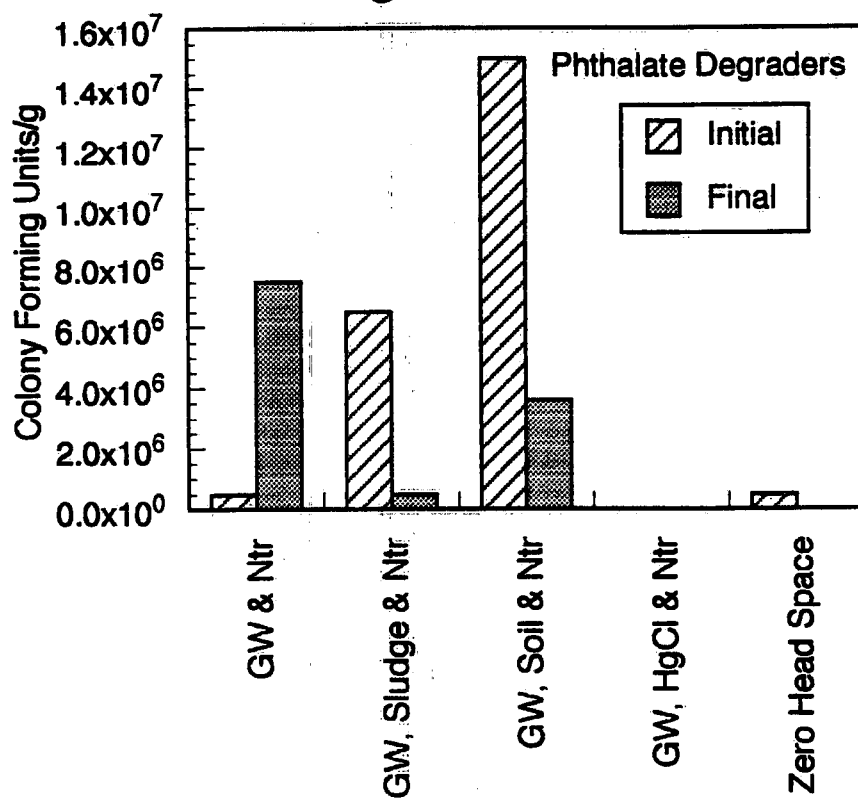
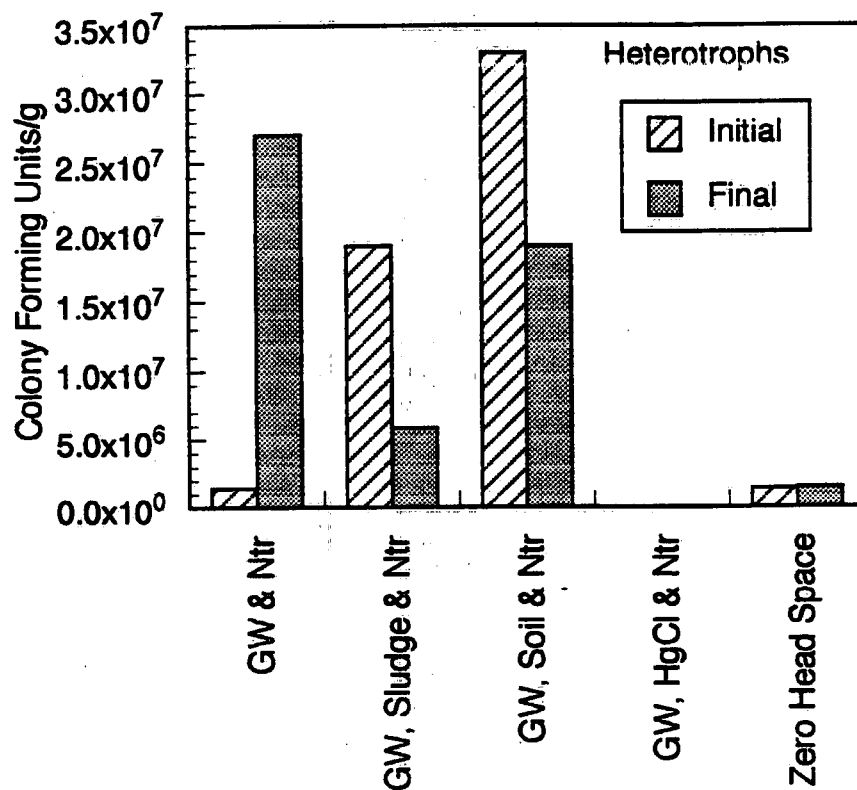


Figure 9

Initial and final microbial population density in groundwater batch treatability tests

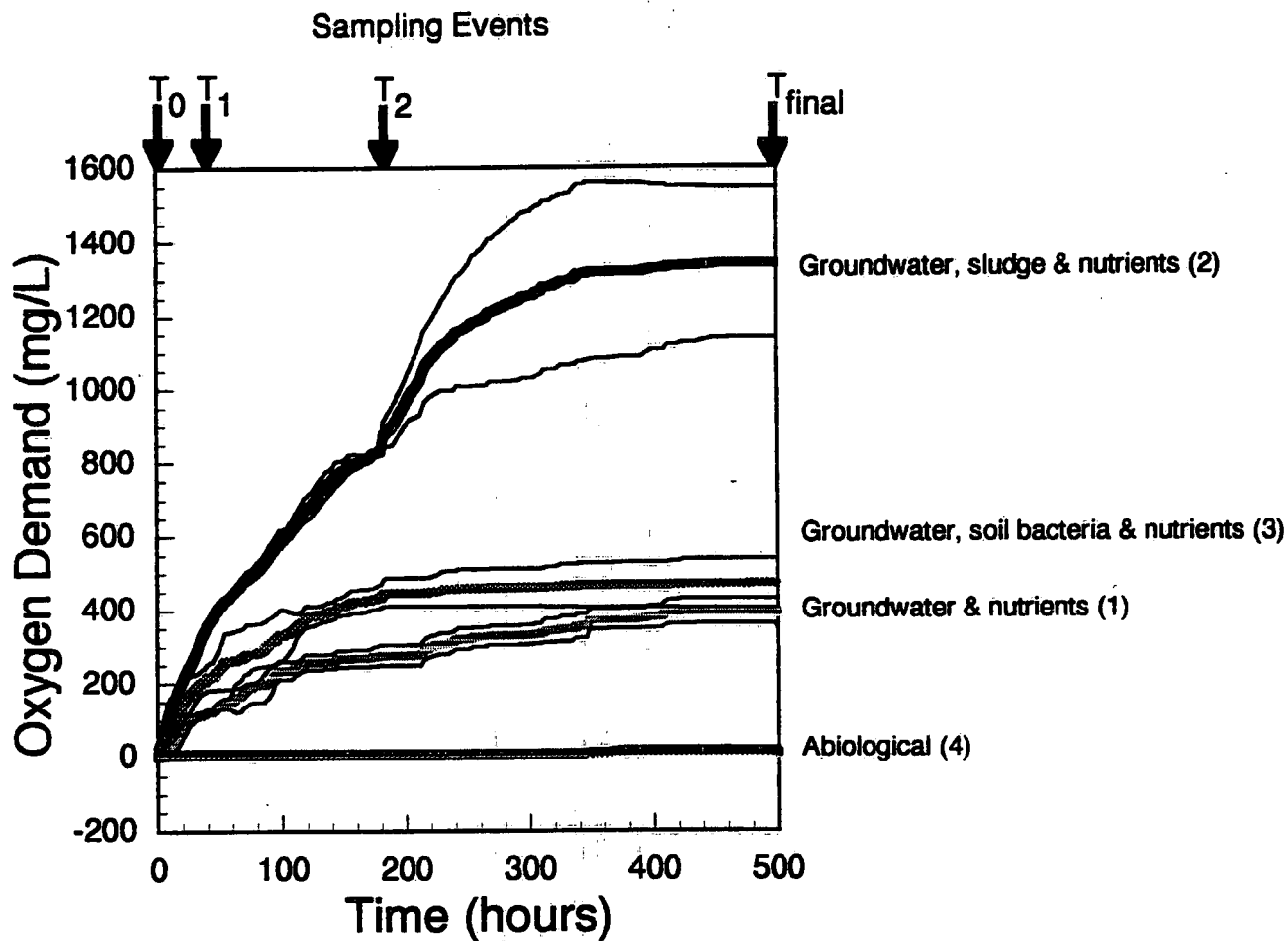


Figure 10

Microbial respiration in groundwater batch treatability studies. Thick lines present the mean of three values for each treatment. Thin lines indicate \pm the standard deviation for each data point. Data collection frequency was 2 hours.

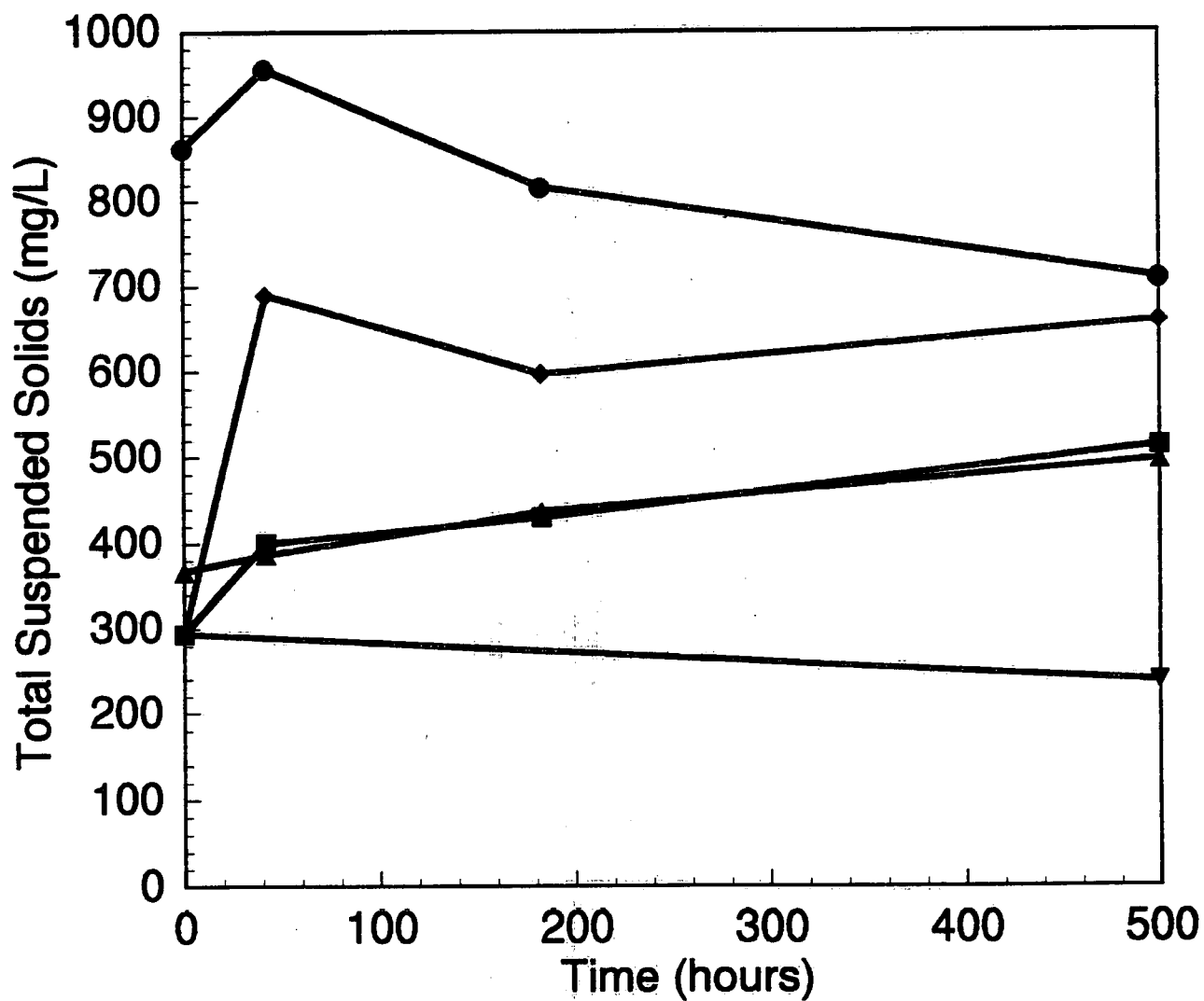
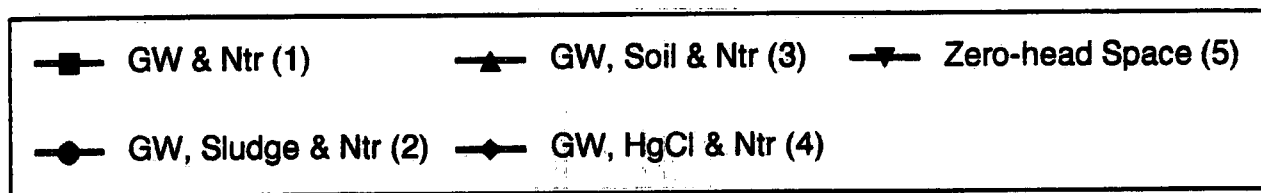


Figure 11

Mean total suspended solids analysis of groundwater treatments.

L. E. Carpenter and Co. IT Project No. 408474.

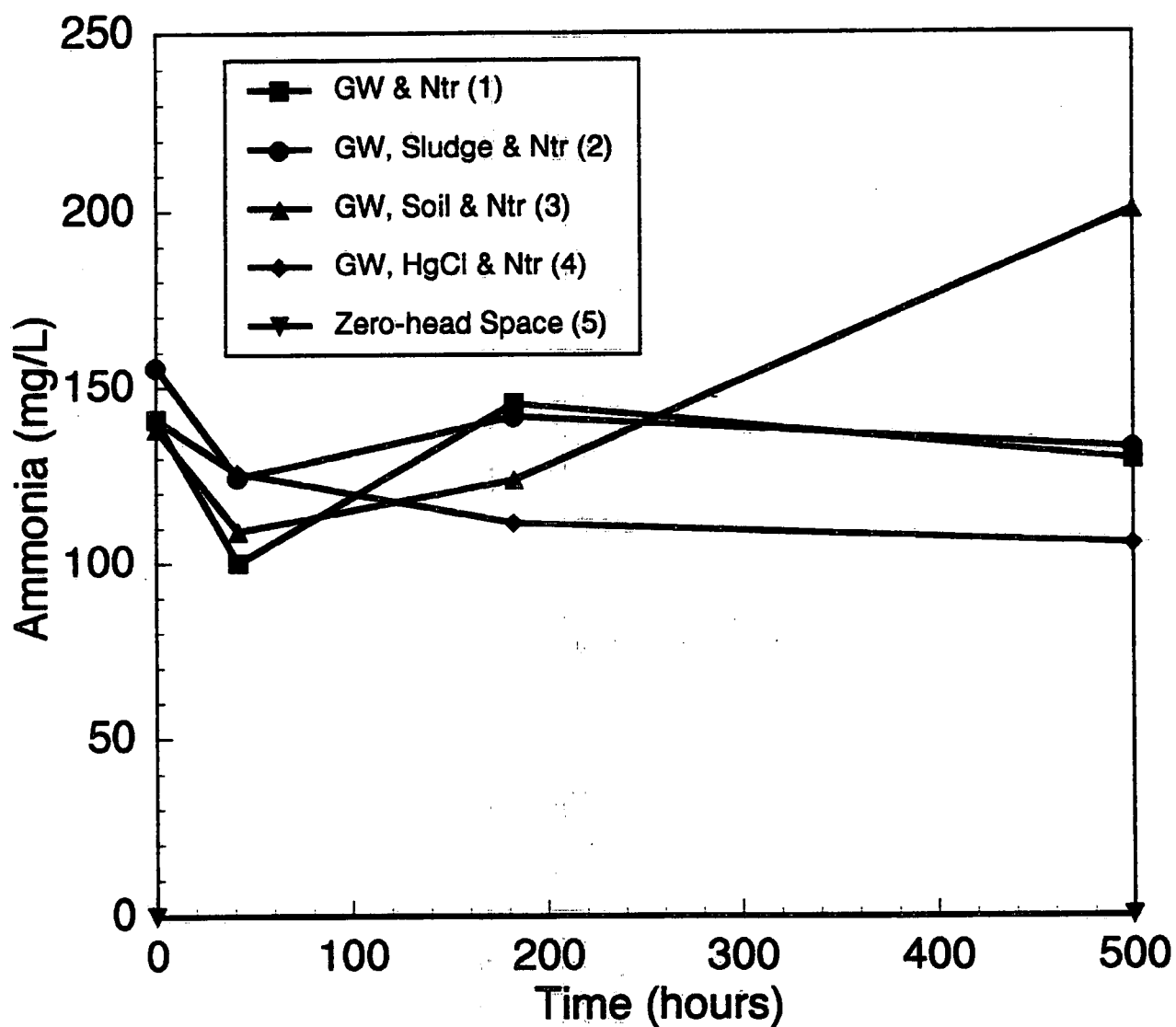


Figure 12

Ammonia utilization during groundwater respiration evaluation.

L. E. Carpenter and Co. IT Project No. 408474.

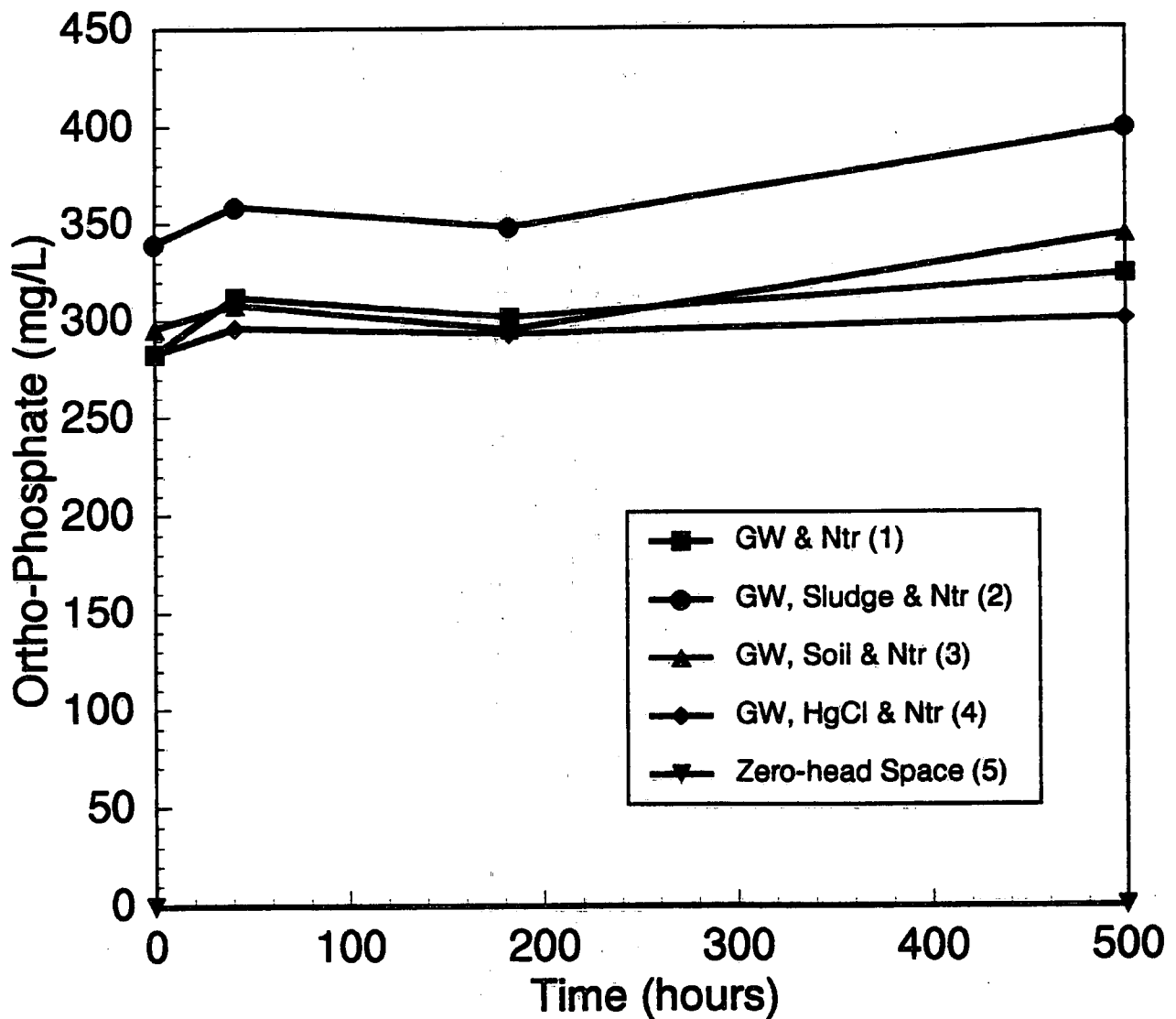


Figure13

**Phosphate utilization during groundwater batch study.
L. E. Carpenter and Co. IT Project No. 408474.**

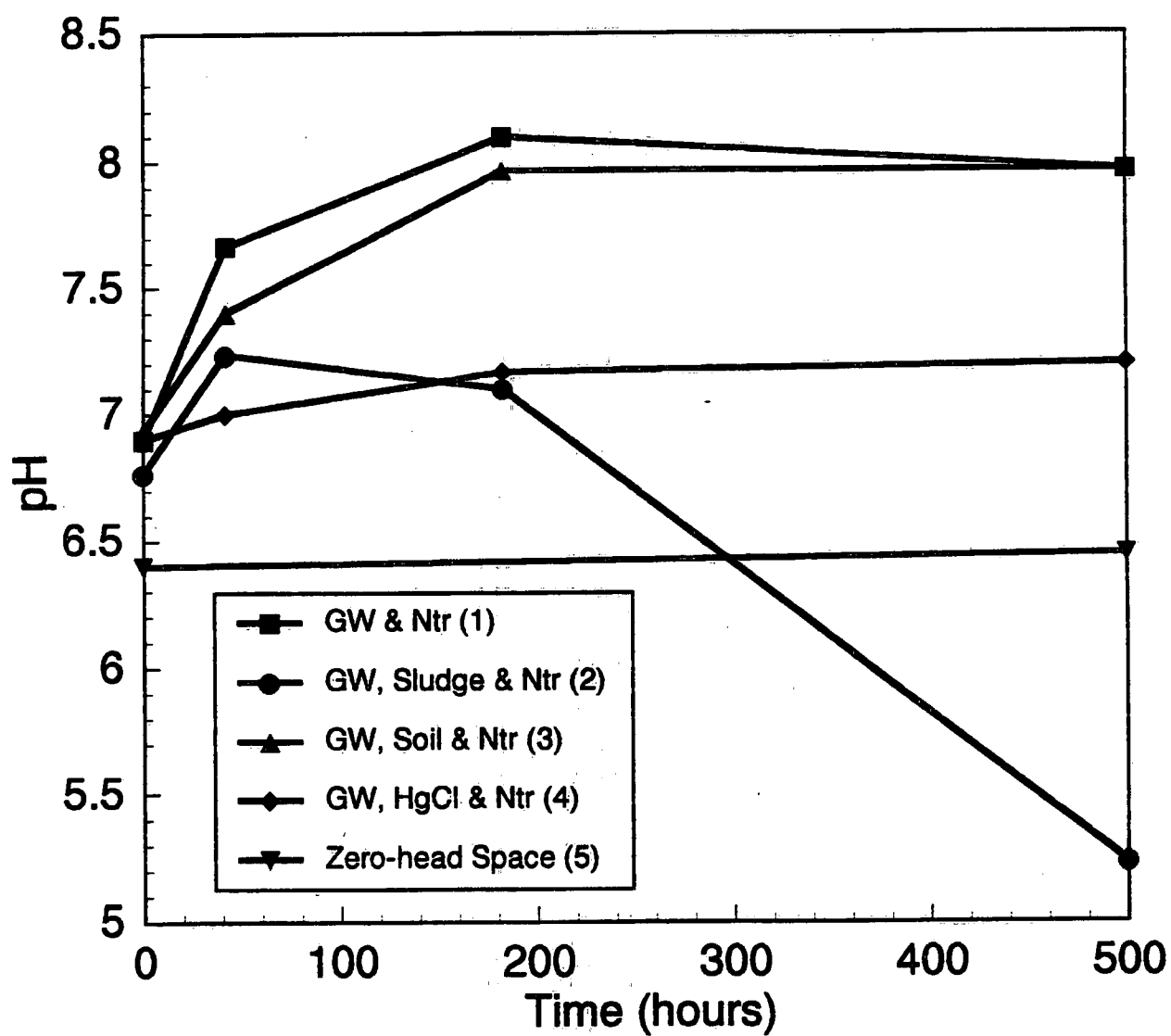


Figure 14

**Change in pH during groundwater batch treatment.
L. E. Carpenter and Co. IT Project No. 408474.**

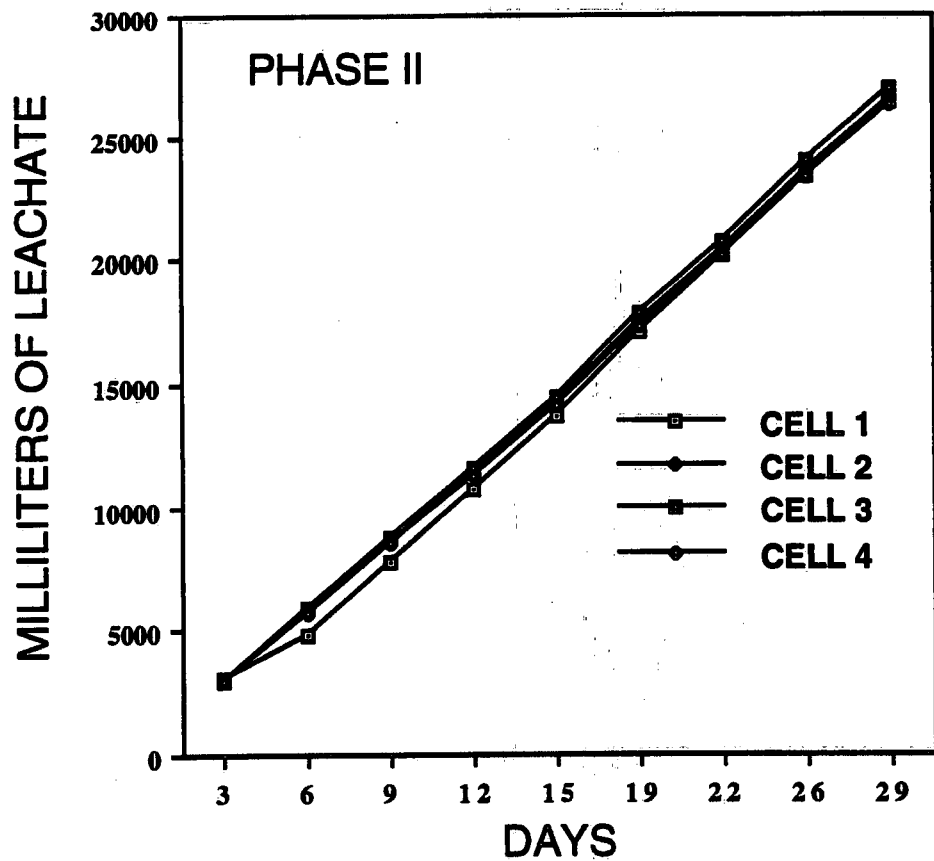
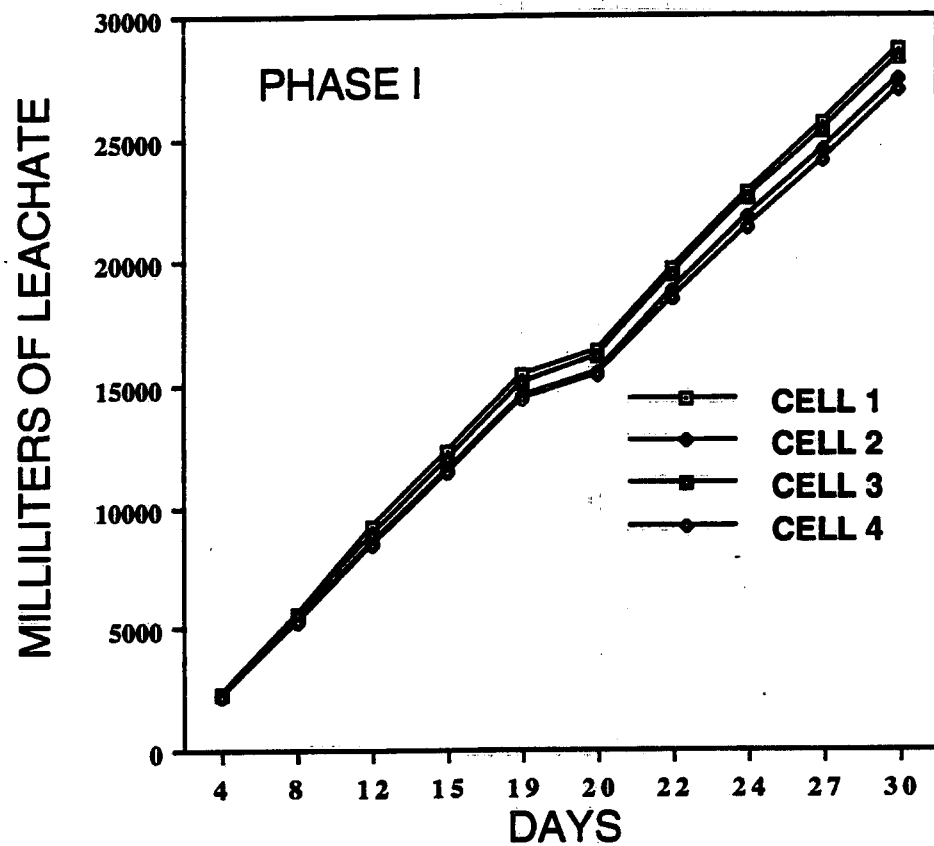


Figure 15
Milliliters of leachate collected for four samples during the two phases of the soil flushing study

SOIL FLUSHING
BIOREMEDIATION AND SOIL FLUSHING
TREATABILITY STUDY REPORT
L. E. CARPENTER AND CO.
PART 2 OF 2

APPENDICES

PREPARED FOR
L. E. CARPENTER AND CO.

PREPARED BY
IT CORPORATION

JUNE 1992
PROJECT NO. 408474

Regional Office

312 Directors Drive • Knoxville, Tennessee 37923 • 615-690-3211

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Appendix A

Sampling Plan

Justification for Locations Selected for Collection of Treatability Study Samples

1.0 INTRODUCTION

Roy F. Weston, Inc. (WESTON) has prepared this document to provide documentation on the locations from which the L.E Carpenter treatability study samples will be collected. Furthermore, this document will discuss the rationale used to determine the selection of these locations.

2.0 SAMPLE LOCATION SELECTION CRITERIA

Soil sampling point locations were selected using two primary criteria: location with respect to known sampling points (i.e., test pit samples, hand auger samples, and monitoring well locations), and concentration of contaminants of concern detected in those previous samples. For the former criteria, locations were first selected based upon their proximity to previous sampling locations with documented contaminant concentration. Specifically, soil sampling locations were chosen which were indicative of low, moderate, and high ranges of contaminants of concern (mainly bis(2-ethylhexyl)phthalate (DEHP)). Furthermore, soil sample locations were selected which should be indicative of general metals concentrations on-site, and not metals "hot spot" conditions.

Wells were also selected using two primary criteria; location of the well with respect to known organic compound sources and known concentrations of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in the wells. For the former criteria, wells were selected from upgradient, source area and downgradient locations. For the latter criteria, wells which showed low, intermediate and high VOC and SVOC concentrations were selected.

3.0 SELECTED LOCATIONS: SOIL

Figure 3-1 indicates the selected locations for collection of background, low, medium, and high concentration Shelby tube samples, in relation with salient site features, such as monitoring wells, property boundaries and the Rockaway River. This map has been compared with other site maps which depict the location of test pit samples which were collected as part of the Remedial Investigation.

The background sample (indicated on Figure 3-1 by S_B) will be collected from a location 100' south of monitoring well MW-1, approximately 60' from the former production well. This is the location from which test pit sample TP78 was collected. This sample indicated minimal concentrations of DEHP (260 ug/kg, also detected in the laboratory method blank), and no volatile organic contamination. This area should also be indicative of the fill material (mine tailings) historically placed at the site.

The low-concentration sample (indicated on Figure 3-1 by S_L) will be located approximately

125' due north of monitoring well cluster MW-11, approximately 60' from recovery well RW-3. This is in the area of test pit sample TP74 which indicated 2089 ug/kg of total base neutral and acid extractable compounds. This location is outside the calculated area of influence resulting from the floating product lens associated with monitoring well MW-11s.

The medium concentration Shelby tube sample will be collected from the location on Wharton Enterprises property, approximately 90' from monitoring well cluster MW-14, adjacent to monitoring well MW3. This location is depicted on Figure 3-1 by S,M, and is in the vicinity of test pits TP3 and TP85, which indicated semivolatile organics in the range of 109,000 ug/kg to 510,000 ug/kg. Additionally, volatile organics (primarily xylenes) were detected at a total concentration of 45,800 ug/kg in TP3 at a depth of 4.5'-5', while PCBs were detected at 14 ppm in the surface soil (0'-5') in TP3.

The high concentration Shelby tube samples will be collected from a location (as depicted on Figure 3-1 by S,H) equidistant from monitoring wells MW6 and MW8, adjacent to property line which L.E. Carpenter shares with Wharton Enterprises. This location was bounded by test pit samples TP5, TP6, TP7, and TP8, which ranged in concentration from 3.1×10^6 ug/kg to 10×10^6 ug/kg DEHP and 200 ug/kg to 532,000 ug/kg total targeted volatiles. If sample collection from this location should prove impracticable in the field, an alternate location (as depicted on Figure 3-1 by AS,H), approximately 25' west of the northwest corner of the tank farm containment pad, will be used. Test pit samples (TP42 - TP48) collected in this area indicated DEHP concentrations ranging from 7.3×10^6 to 30×10^6 ug/kg.

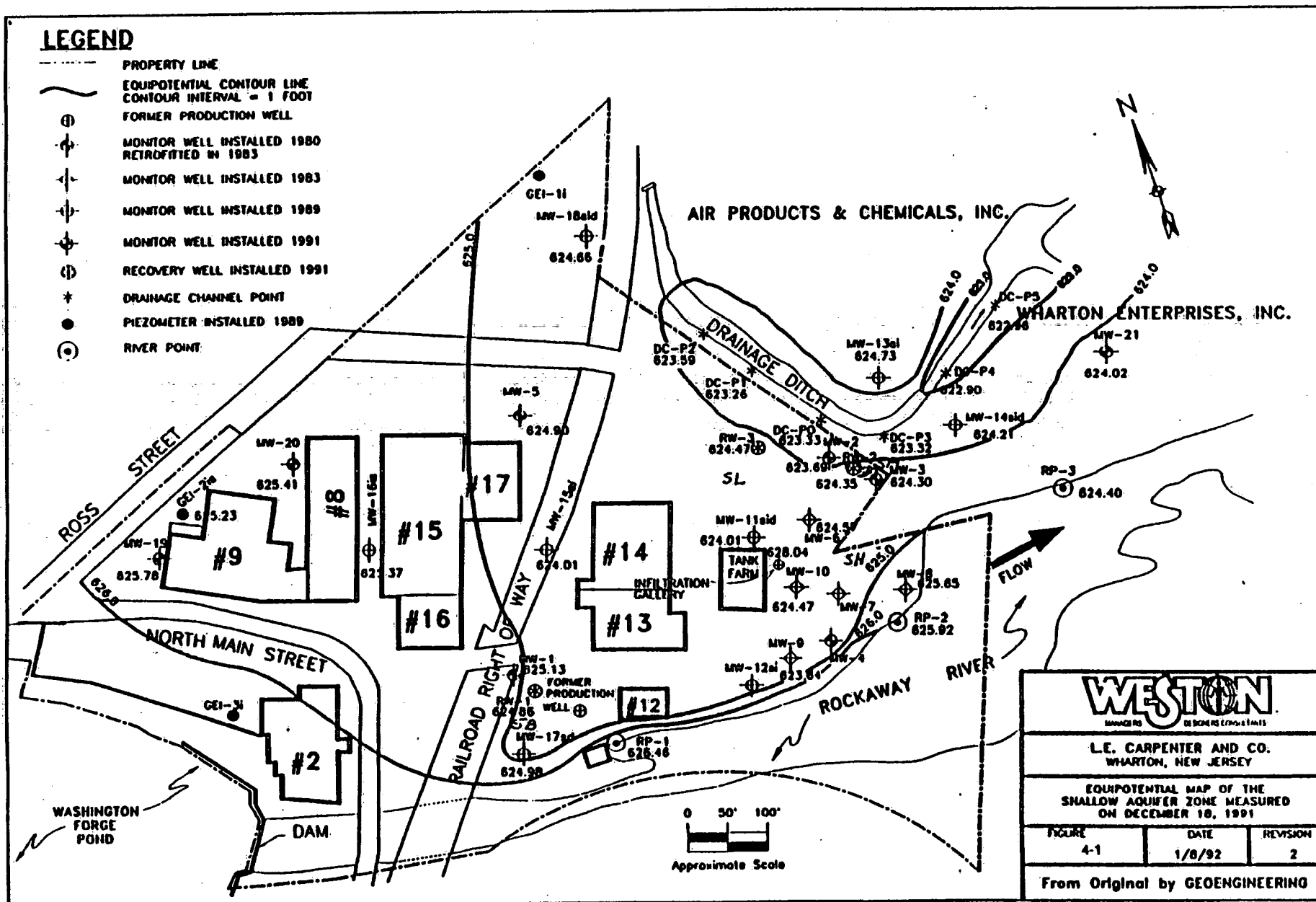
In all cases, the Shelby tube samples will be collected in two adjacent 30" lengths (60" total length) immediately above the water table. Since the contaminants of concern have the capability of forming a lighter than water, non-aqueous phase layer (LNAPL), the highest concentrations in vadose zone soils would be expected between the water table and the historic high water table. These soils would be the primary focus of an in-situ treatment scheme. Therefore, soil samples collected from this depth would most closely delineate actual in-situ treatment parameters.

4.0 SELECTED LOCATIONS - GROUNDWATER

Figure 4-1 shows the equipotential surface of the shallow aquifer zone measured in November of 1991. This figure illustrates the main aspects of the shallow hydrogeology of this site. In the vicinity of the site, the Rockaway River is a recharge boundary. Shallow aquifer zone groundwater flow vectors along the river area oriented to the north. Toward the center of the site, these vectors swing back to the east and are oriented parallel to the Rockaway River. Figure 4-2 shows that there are two main source areas; a localized area around MW-1 and a larger area around the former impoundment area east of the tank farm. The western portion of the treatability study area is considered to be upgradient and the eastern portion is considered to be downgradient. Three general well locations; upgradient, source area and downgradient; can be selected using this information. With

LEGEND

- PROPERTY LINE
- ~~~~~ EQUIPOTENTIAL CONTOUR LINE
CONTOUR INTERVAL = 1 FOOT
- FORMER PRODUCTION WELL
- ⊕ MONITOR WELL INSTALLED 1980
RETROFITTED IN 1983
- ⊕ MONITOR WELL INSTALLED 1983
- ⊕ MONITOR WELL INSTALLED 1989
- ⊕ MONITOR WELL INSTALLED 1991
- ⊕ RECOVERY WELL INSTALLED 1991
- ★ DRAINAGE CHANNEL POINT
- PIEZOMETER INSTALLED 1989
- ⊙ RIVER POINT



WESTON
MANAGERS DESIGNERS ENGINEERS

L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY

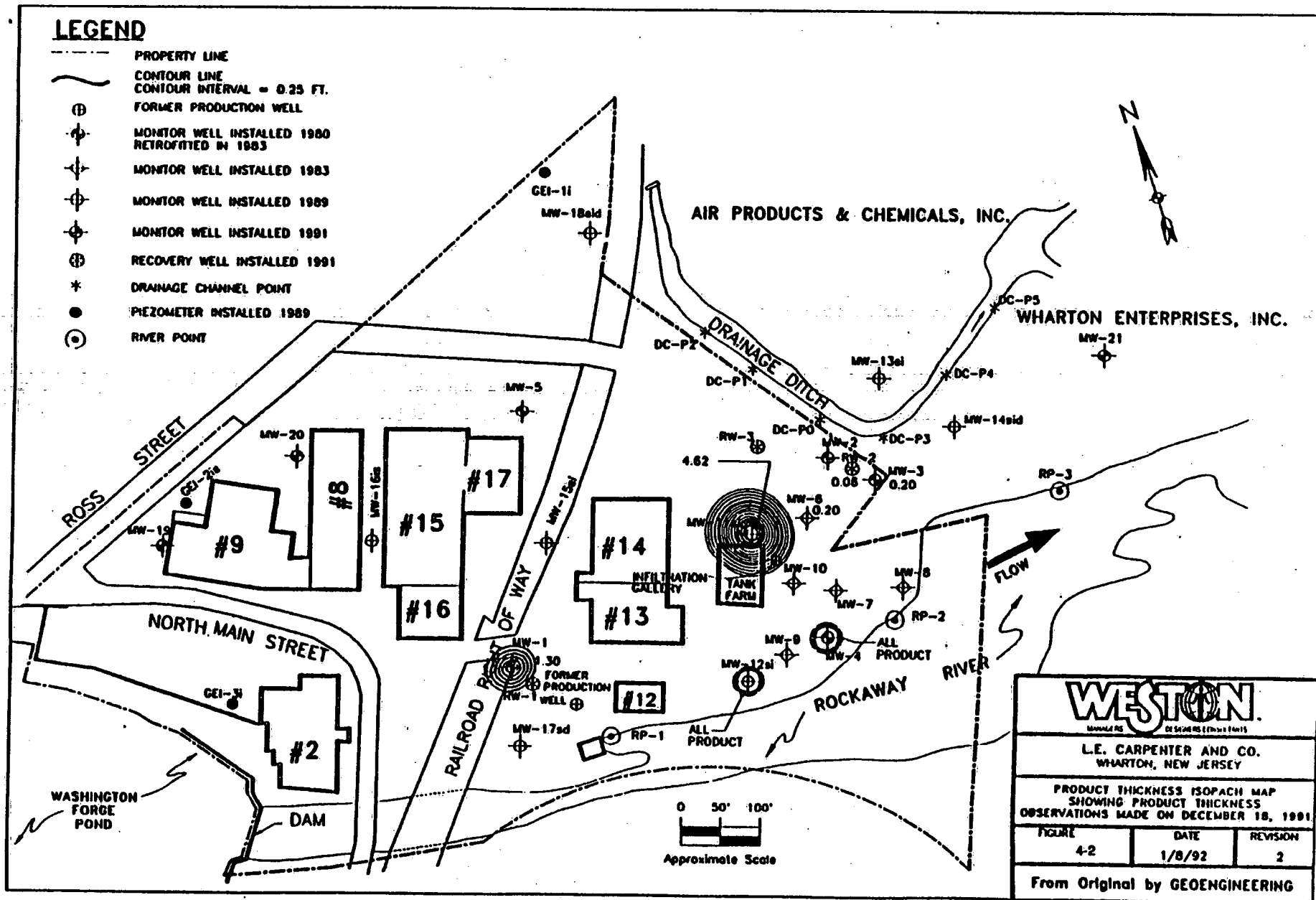
EQUIPOTENTIAL MAP OF THE
SHALLOW AQUIFER ZONE MEASURED
ON DECEMBER 10, 1991

FIGURE	DATE	REVISION
4-1	1/8/92	2

From Original by GEOENGINEERING

LEGEND

- PROPERTY LINE
- CONTOUR LINE
CONTOUR INTERVAL = 0.25 FT.
- ⊕ FORMER PRODUCTION WELL
- ⊕ MONITOR WELL INSTALLED 1980
RETROFITTED IN 1983
- ⊕ MONITOR WELL INSTALLED 1983
- ⊕ MONITOR WELL INSTALLED 1989
- ⊕ MONITOR WELL INSTALLED 1991
- ⊕ RECOVERY WELL INSTALLED 1991
- * DRAINAGE CHANNEL POINT
- PIEZOMETER INSTALLED 1989
- RIVER POINT



respect to the former impoundment area, MW-15S can be considered an upgradient well. Source area wells include MW-3, MW-6, and MW-11S. MW-14S is the downgradient well.

These wells will also provide a representative sampling of the full range of VOC and SVOC concentrations. Table 3-1 shows total concentration of targeted VOCs and SVOCs from the remedial investigation second sampling round. Figures 4-3 and 4-4 depict the distribution of VOCs and SVOCs, respectively, in shallow aquifer zone. These maps and Table 4-1 show that the upgradient and downgradient wells (MW-15S and MW-14S, respectively) feature the lowest organic compound concentration and that the intermediate and high organic compound concentrations are associated with the source area wells (MW-3, MW-6 and MW-11S).



TABLE 4-1

SUMMARY OF VOC AND SVOC ANALYTICAL RESULTS
FOR SELECTED GROUNDWATER TREATABILITY STUDY WELLS
L.E. CARPENTER SITE, WHARTON, NEW JERSEY

	CONCENTRATION (ug/L)				
PARAMETER	MW-15S	MW-11S	MW-6	MW-3	MW-14S
Total Targeted VOCs	ND	NA	136,000	39,700	ND
Total Targeted SVOCs	ND	NA	67,898	40,723	793

* Source: Second groundwater sampling round, WESTON (1990).

ND = Non Detect

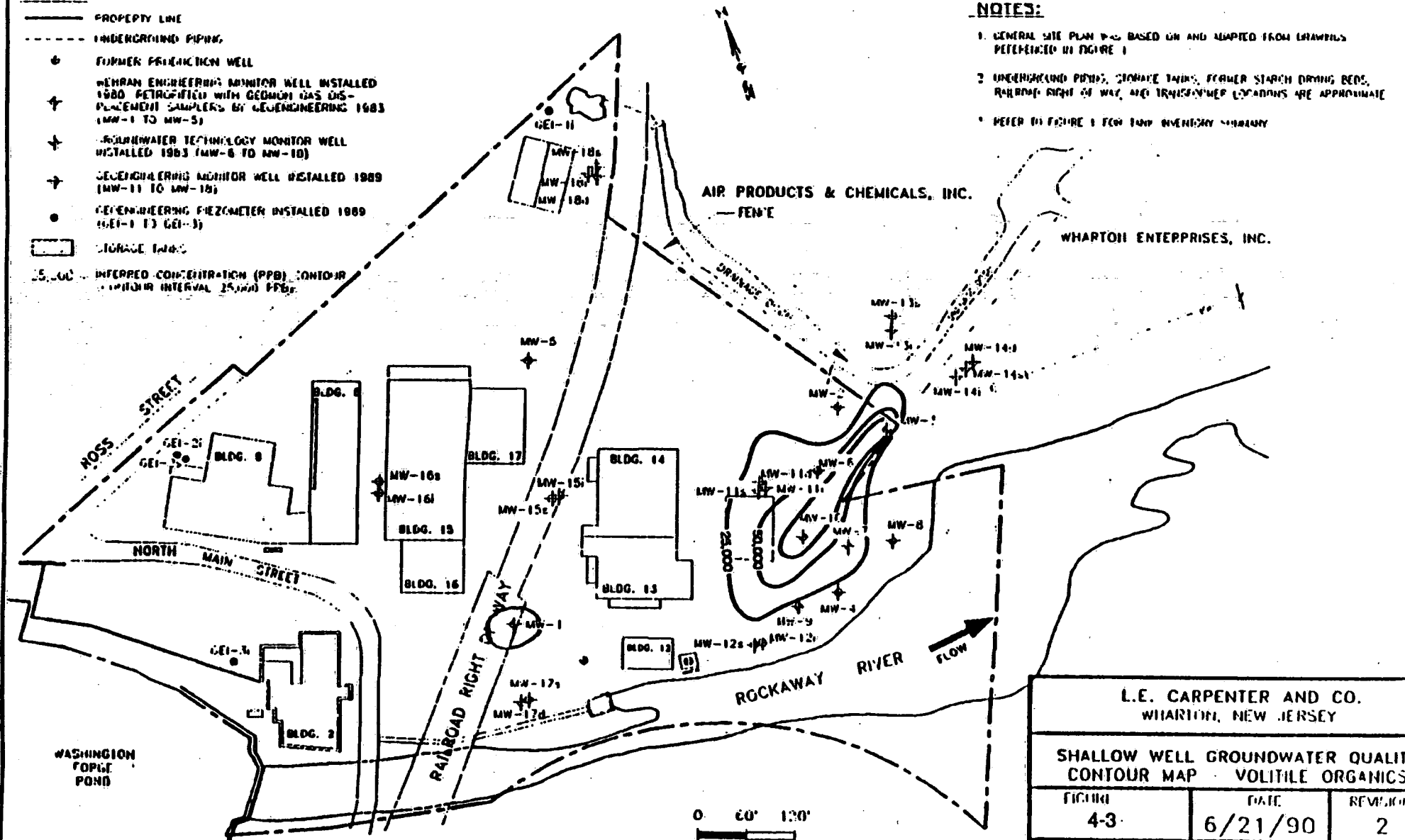
NA = No Analytical Data Available

LEGEND

- PROPERTY LINE
- - - UNDERGROUND PIPING
- FORMER PRODUCTION WELL
- ✦ WEHRAN ENGINEERING MONITOR WELL INSTALLED 1980. PETROFAC WITH GEOMON GAS DIS-PLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5)
- ✦ GROUNDWATER TECHNOLOGY MONITOR WELL INSTALLED 1983 (MW-6 TO MW-10)
- ✦ GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-18)
- GEOENGINEERING PIEZOMETER INSTALLED 1989 (GEI-1 TO GEI-5)
- ◻ STORAGE TANK
- 25,000 INFERRED CONCENTRATION (PPB) CONTOUR
CONTOUR INTERVAL 25,000 PPB

NOTES:

1. GENERAL SITE PLAN WAS BASED ON AND ADAPTED FROM DRAWINGS REFERENCED IN FIGURE 1
2. UNDERGROUND PIPING, STORAGE TANKS, FORMER STARCH DRYING BEDS, RAILROAD RIGHT OF WAY, AND TRUCKWAY LOCATIONS ARE APPROXIMATE
3. REFER TO FIGURE 1 FOR TANK INVENTORY SUMMARY



L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY

SHALLOW WELL GROUNDWATER QUALITY
CONTOUR MAP - VOLATILE ORGANICS

FIGURE	DATE	REVISION
4-3	6/21/90	2

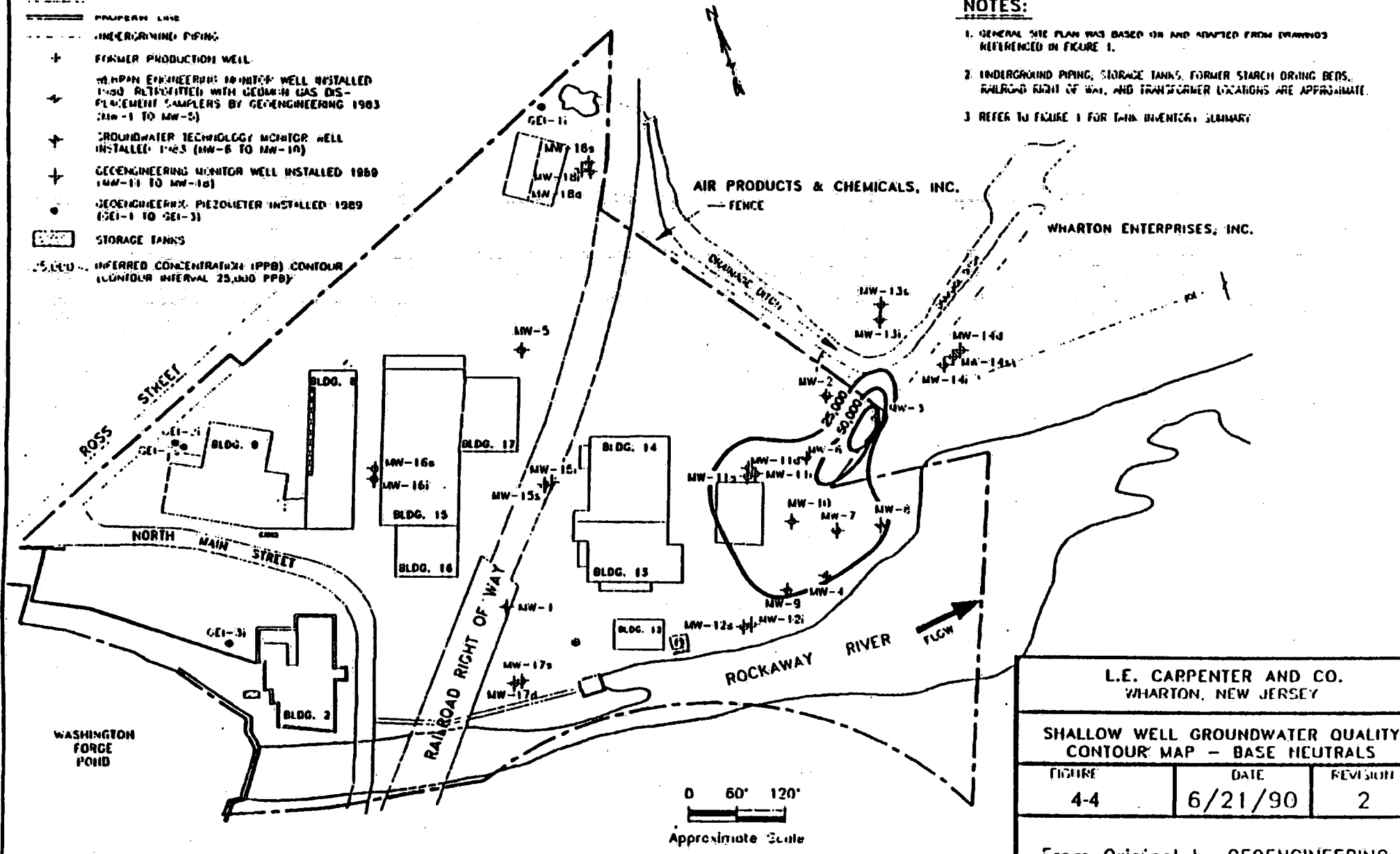
From Original by GEOENGINEERING

LEGEND

- PROPERTY LINE
- UNDERGROUND PIPING
- FORMER PRODUCTION WELL
- MCMAN ENGINEERING MONITOR WELL INSTALLED 1980 (RETRACTED WITH GEOMIN GAS DIS-PLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5))
- GROUNDWATER TECHNOLOGY MONITOR WELL INSTALLED 1983 (MW-6 TO MW-10)
- GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-16)
- GEOENGINEERING PIEZOMETER INSTALLED 1989 (GEI-1 TO GEI-3)
- STORAGE TANKS
- 5,000 INFERRED CONCENTRATION (PPB) CONTOUR (CONTOUR INTERVAL 25,000 PPB)

NOTES:

1. GENERAL SITE PLAN WAS BASED ON AND ADAPTED FROM DRAWINGS REFERENCED IN FIGURE 1.
2. UNDERGROUND PIPING, STORAGE TANKS, FORMER STARCH DRYING BEDS, RAILROAD RIGHT OF WAY, AND TRANSFORMER LOCATIONS ARE APPROXIMATE.
3. REFER TO FIGURE 1 FOR TANK INVENTORY SUMMARY



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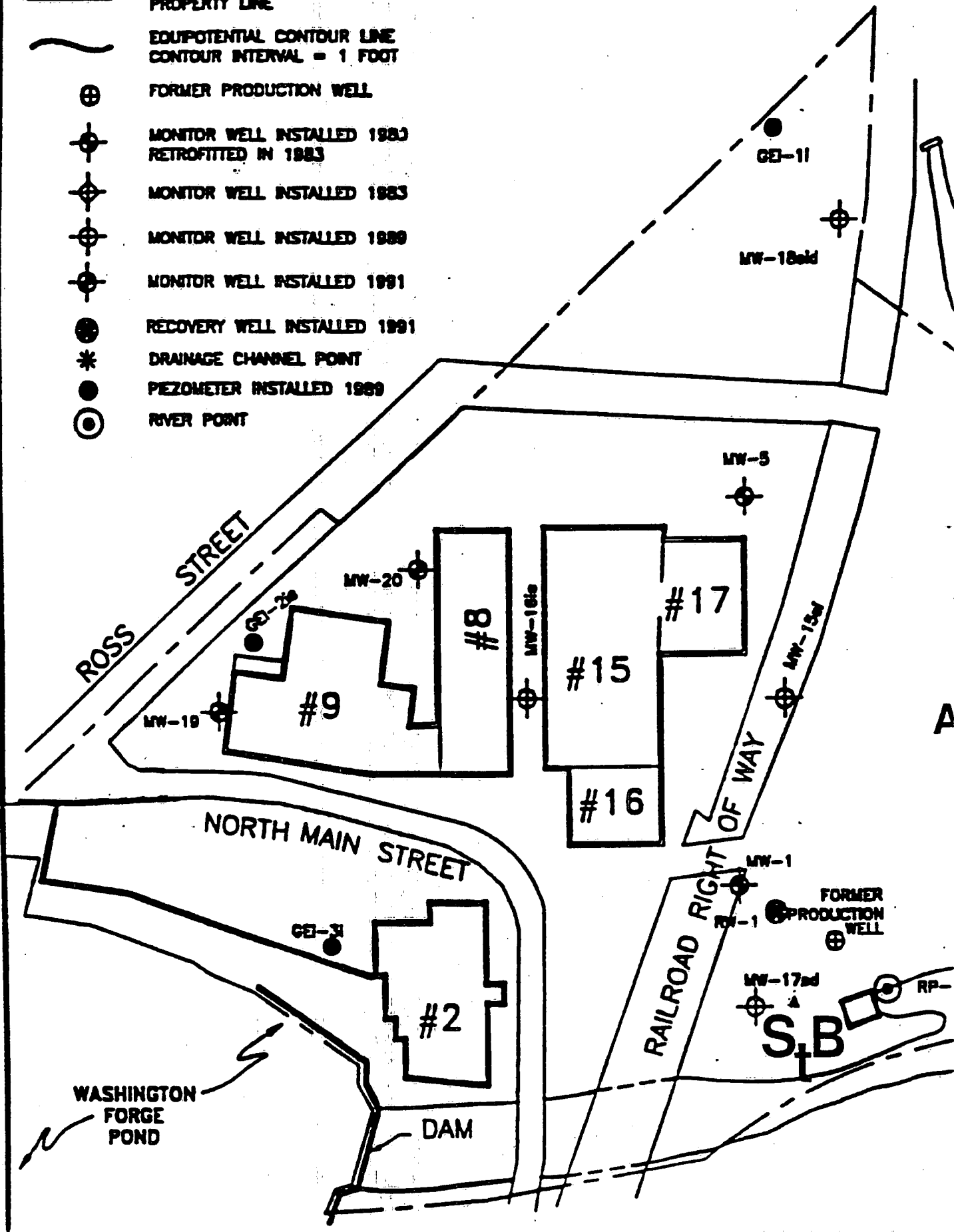
SHALLOW WELL GROUNDWATER QUALITY
CONTOUR MAP - BASE NEUTRALS

FIGURE	DATE	REVISION
4-4	6/21/90	2

From Original by GEOENGINEERING

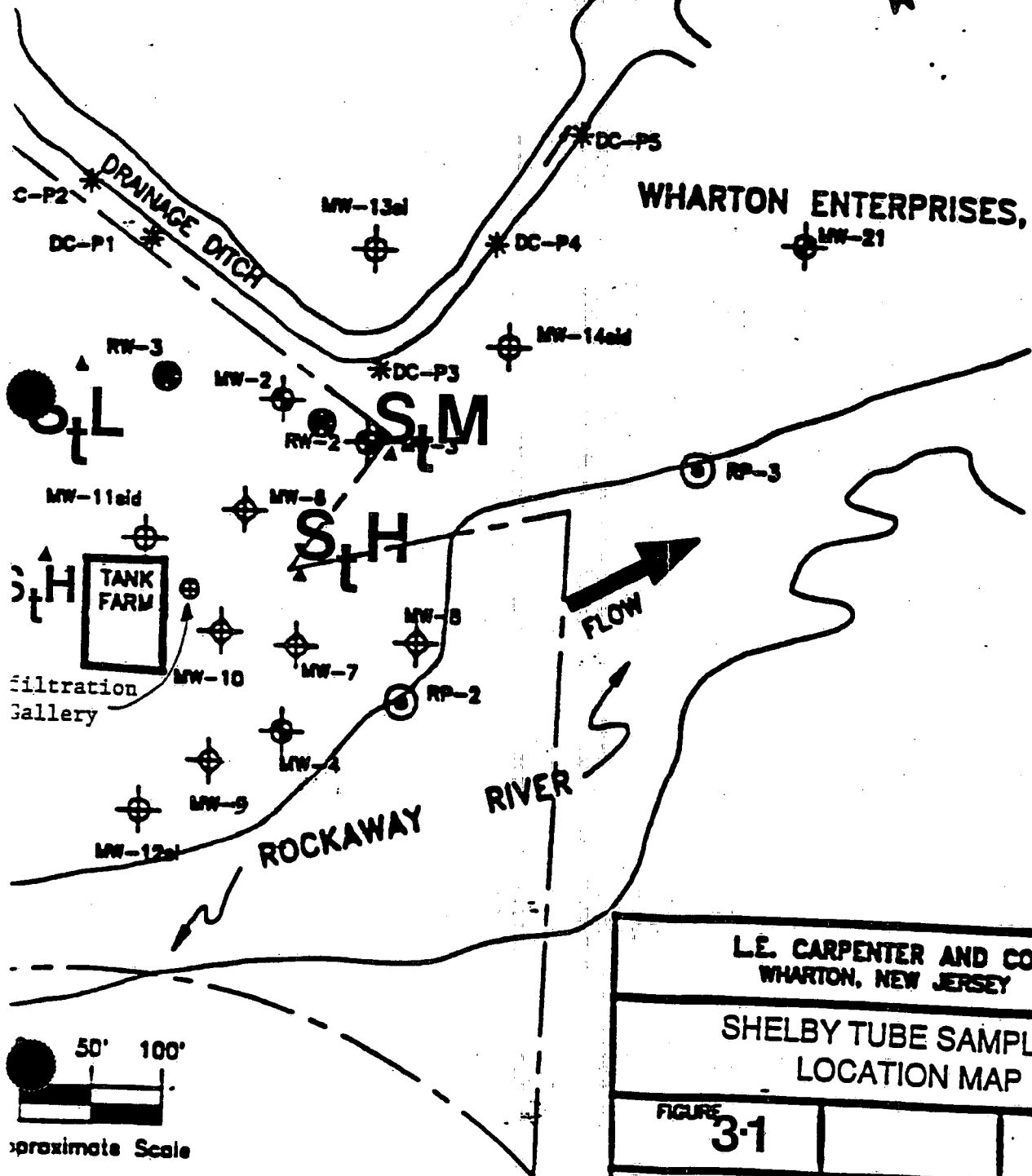
LEGEND

- PROPERTY LINE
- ~ EQUIPOTENTIAL CONTOUR LINE
CONTOUR INTERVAL = 1 FOOT
- ⊕ FORMER PRODUCTION WELL
- ⊕ MONITOR WELL INSTALLED 1983
RETROFITTED IN 1983
- ⊕ MONITOR WELL INSTALLED 1983
- ⊕ MONITOR WELL INSTALLED 1989
- ⊕ MONITOR WELL INSTALLED 1991
- RECOVERY WELL INSTALLED 1991
- * DRAINAGE CHANNEL POINT
- PIEZOMETER INSTALLED 1989
- ⊙ RIVER POINT



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SHELBY TUBE SAMPLING
LOCATION MAP

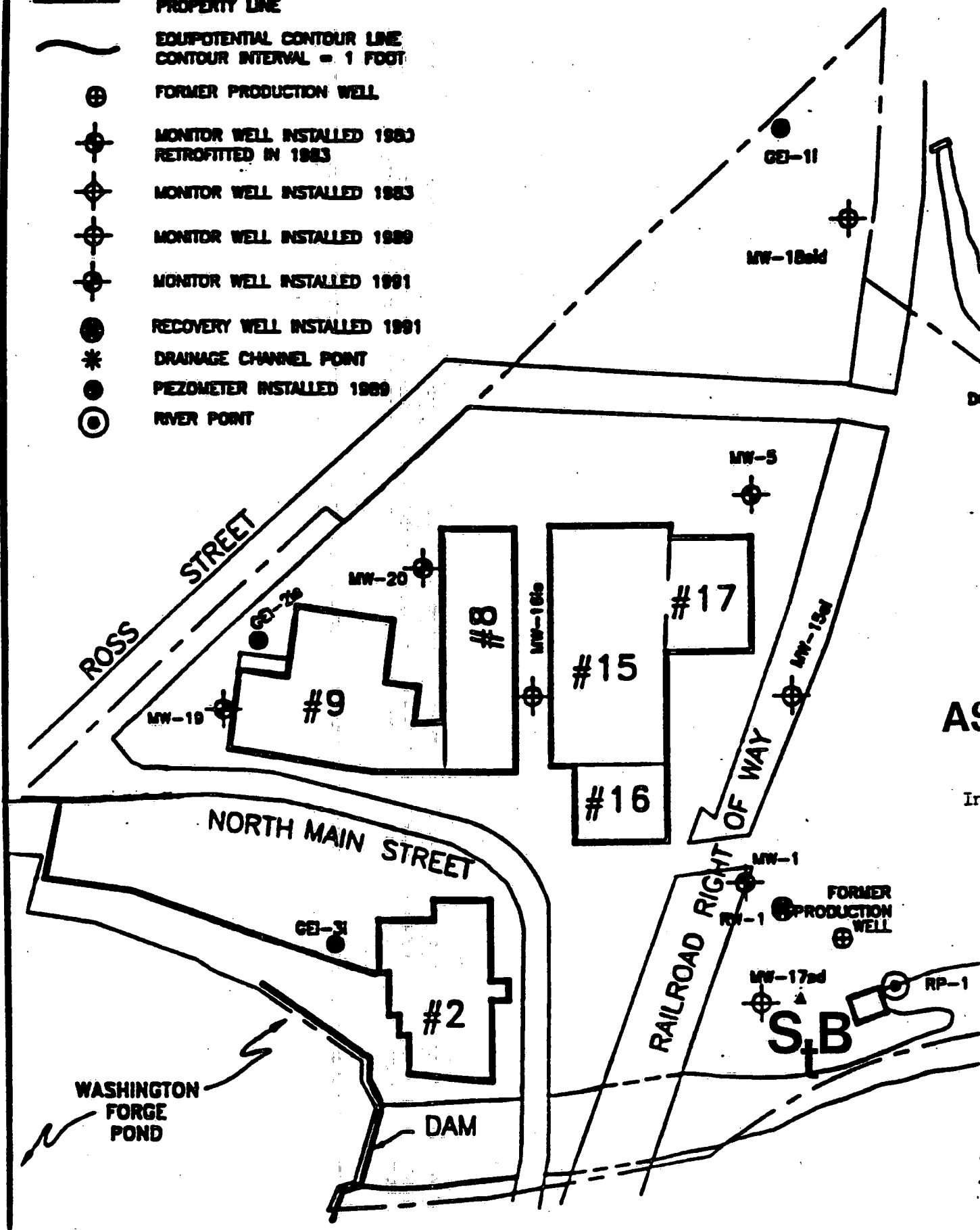
FIGURE

3-1

From Original by GEOTECHNICAL

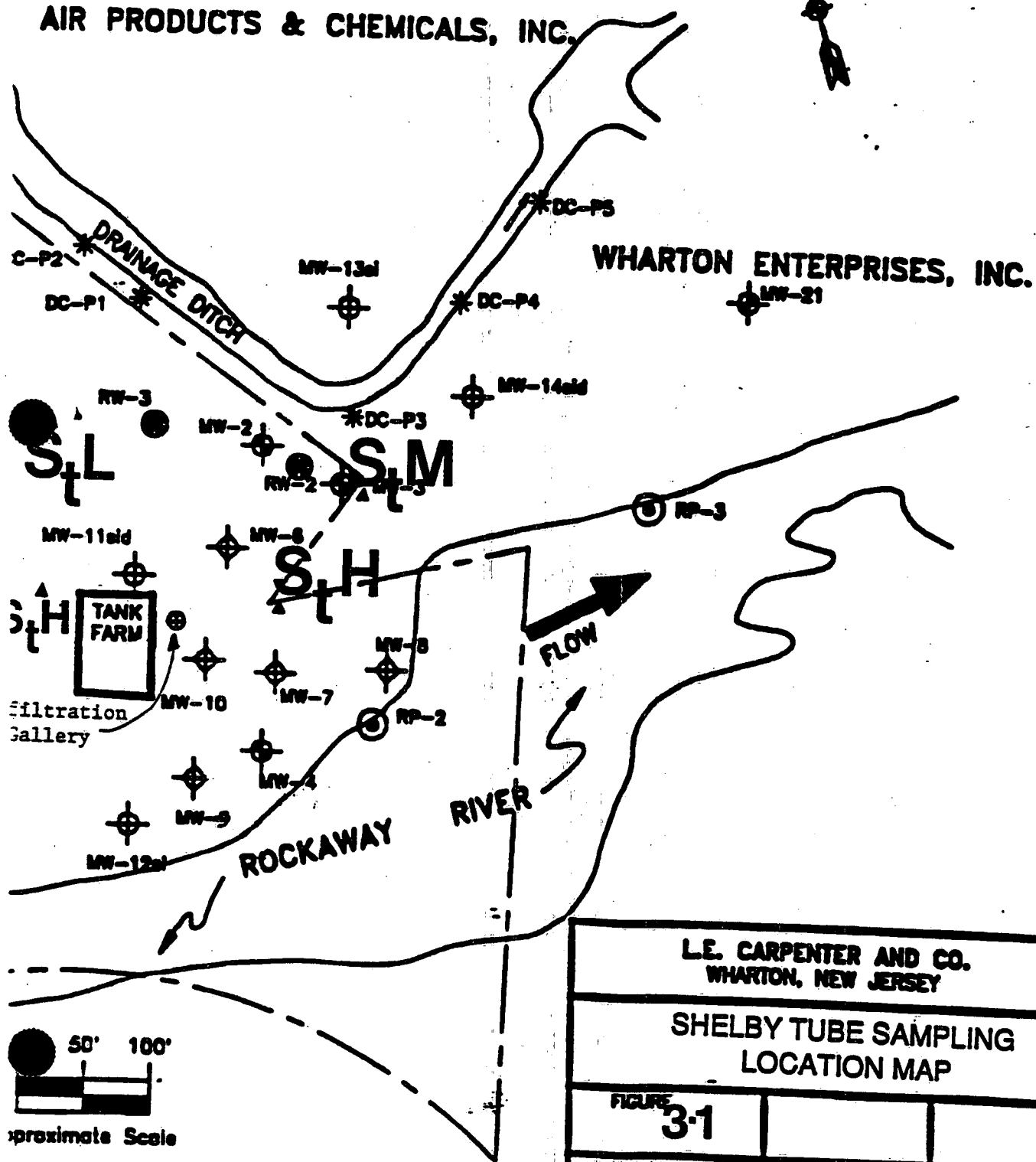
LEGEND

- PROPERTY LINE
- ~ EQUIPOTENTIAL CONTOUR LINE
CONTOUR INTERVAL = 1 FOOT
- ⊕ FORMER PRODUCTION WELL
- ⊕ MONITOR WELL INSTALLED 1983
RETROFITTED IN 1983
- ⊕ MONITOR WELL INSTALLED 1983
- ⊕ MONITOR WELL INSTALLED 1989
- ⊕ MONITOR WELL INSTALLED 1991
- RECOVERY WELL INSTALLED 1991
- * DRAINAGE CHANNEL POINT
- PIEZOMETER INSTALLED 1989
- ⊙ RIVER PORT



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SHELBY TUBE SAMPLING
LOCATION MAP

FIGURE
3-1

From Original by GEOENGINEERING

Appendix B

Initial Characterization Data

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: Duane Graves

March 9, 1992

Job Number: REA 50598

P.O. Number: 408474.01

This is the Certificate of Analysis for the following samples:

Client Project ID:	Roy F. Weston - L.F. Carpenter
Date Received by Lab:	02/08/92
Number of Samples:	Six (6)
Sample Type:	Water

I. Introduction

On 02/08/92, six (6) water samples arrived at the ITAS-Knoxville, Tennessee laboratory from Roy F. Veston in Edison, New Jersey. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

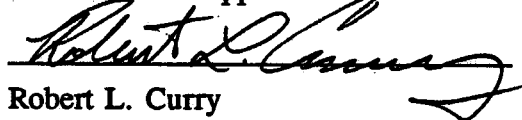
II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The composite sample was analyzed for the requested metals by inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 method 6010.

Reviewed and Approved:



Robert L. Curry
Laboratory Systems Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

II. Analytical Results/Methodology (continued)

Biochemical oxygen demand (BOD) was measured by five day incubation using EPA method 405.1.

Chemical oxygen demand (COD) was measured using the EPA approved HACH procedure, HACH Water Analysis Handbook, HACH Chemical Company, 1980.

The composite sample was analyzed for acidity based on EPA method 305.2.

The composite sample was analyzed for alkalinity based on EPA method 310.3.

The pH of the composite sample was determined using EPA method 150.1.

The composite sample was analyzed for specific conductance based on EPA method 120.1.

The total dissolved solids (TDS) content of the composite sample was determined using EPA method 160.1.

The total solids content of the composite sample was determined using EPA method 160.3.

The total suspended solids (TSS) content of the composite sample was determined using EPA method 160.2.

The composite sample was analyzed for ammonia based on EPA method 350.2.

The composite sample was analyzed for total Kjeldahl nitrogen (TKN) based on EPA method 351.3.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs went well; however, MW3 and MW6 had high levels of ethyl benzene and other non-target organics and exhibited slightly high BFB surrogate recoveries. The dilutions showed normal recovery levels indicating a possible matrix effect from the sample. Ethyl benzene was seen at level below the quantification limit in Method Blank 2 but this had no impact on the validity of the data. There were no problems seen in final data review.

The composite sample was digested on 02/14/92 for ICP and were analyzed by ICP on 02/14/92. All run QC was acceptable. No problems were encountered.

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

III. Quality Control (continued)

The BOD of the composite sample was measured using a five-day incubation period. The dissolved oxygen (DO) was measured initially and after incubation; the BOD was computed using the difference between the initial and final DO. All run QC was acceptable. No major problems were encountered.

The COD of the composite sample was measured using the reactor digestion method followed by titration with ferrous ammonium sulfate. All run QC was acceptable. No major problems were encountered.

The composite sample was titrated for acidity/alkalinity content. All run QC was acceptable. No major problems were encountered. All run QC was acceptable. No major problems were encountered.

The pH of the composite sample was measured by electrometric procedure; the activity of the hydrogen ions was determined by potentiometric measurement using a standard hydrogen electrode and a reference electrode. All run QC was acceptable. No major problems were encountered.

The composite sample was analyzed for specific conductance. All run QC was acceptable. No major problems were encountered.

The TDS content of the composite sample was determined gravimetrically by filtration and evaporation of the filtrate to a constant weight at 180°C. All run QC was acceptable. No major problems were encountered.

The total solids content of the composite sample was measured gravimetrically by evaporation to dryness at 103-105°C. All run QC was acceptable. No major problems were encountered.

The TSS content of the composite sample was determined gravimetrically by filtration and measurement of the filter residue weight after drying at 103-105°C. All run QC was acceptable. No major problems were encountered.

The composite sample was analyzed for ammonia by distillation followed by Nesslerization using HACH reagents. All run QC was acceptable. No major problems were encountered.

The composite sample was prepared for TKN analysis by acid digestion/distillation using a micro-Kjeldahl system. The distillate was analyzed by Nesslerization using HACH reagents. All run QC was acceptable. No major problems were encountered.

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB02125

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 02/12/92

This method blank applies to the following samples: MW2, MW3 and MW6.

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March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: MW2
Lab Sample ID: SS5241

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	46
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 02/12/92

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: MW3
Lab Sample ID: SS5242

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	3 J	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	2,000 D
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	6
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 02/12/92

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: MW6
Lab Sample ID: SS5243

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	14	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	13,000 D
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	11
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	3 J

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 02/12/92

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: VB02132

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	3 J
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 02/13/92

This method blank applies to the following samples: MW14S, MW15S, MW3 DL and MW6 DL.

DL - Dilution

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March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: MW14S

Lab Sample ID: SS5244

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 02/13/92

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: MW15S

Lab Sample ID: SS5245

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 02/13/92

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March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

WATER SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	VOLATILE		
	Toluene-D8 (88-110%)*	BFB (86-115%)*	1,2 Dichloroethane-D4 (76-114%)*
MW14S	93	101	94
MW15S	92	100	94
MW2	95	97	92
MW3	101	125 **	95
MW3 DL	95	103	96
MW6	109	137 **	99
MW6 DL	95	103	95
Method Blank 1	96	96	94
Method Blank 2	95	99	94

*Values in parenthesis represent required QC limits.

**Values are outside of required QC limits.

DL - Dilution

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March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

METALS ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: PBWE4432

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
aluminum	0.04 U	lead	0.03 U
antimony	0.03 U	magnesium	0.03 U
arsenic	0.05 U	manganese	0.002 U
barium	0.002 U	nickel	0.02 U
beryllium	0.001 U	potassium	1 U
cadmium	0.005 U	selenium	0.06 U
calcium	0.05	silver	0.005 U
chromium	0.01 U	sodium	0.2 U
cobalt	0.02 U	thallium	0.05 U
copper	0.01	vanadium	0.01 U
iron	0.01 U	zinc	0.007

Date Digested: 02/14/92
Date Analyzed: 02/14/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

METALS ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID: COMPOSITE

Lab Sample ID: SS5240

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
aluminum	15.1	lead	0.03 U
antimony	0.03 U	magnesium	23.3
arsenic	0.05 U	manganese	150
barium	2.8	nickel	2.4
beryllium	0.001 U	potassium	5
cadmium	0.006	selenium	0.09
calcium	65.6	silver	0.005 U
chromium	3.1	sodium	12.0
cobalt	0.15	thallium	0.05 U
copper	0.18	vanadium	0.06
iron	427	zinc	0.23

Date Digested: 02/14/92

Date Analyzed: 02/14/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

CLASSICAL PARAMETERS ANALYSIS

Results in mg/liter (ppm) unless otherwise stated

Sample Matrix: Water

Client Sample ID: Lab Sample ID:	Method Blank <u>P3456/P3457/P3476/P3505/P3455/P3464/P3463/P3465</u>	Date of Analysis
acidity, as CaCO ₃	4	02/10/92
alkalinity, as CaCO ₃	2	02/10/92
ammonia, as N	0.1 U	02/13/92
biochemical oxygen demand	*	02/08/92
chemical oxygen demand	*	02/19/92
total Kjeldahl nitrogen	0.1 U	02/20/92
pH (standard units)	*	02/08/92
specific conductance (μmhos/cm)	4	02/10/92
total dissolved solids	8	02/12/92
total solids	1 U	02/12/92
total suspended solids	1 U	02/12/92

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
* - A method blank is not applicable for these analyses.

IT Corporation
March 9, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Roy F. Weston - L.F. Carpenter

Job Number: REA 50598

CLASSICAL PARAMETERS ANALYSIS

Results in mg/liter (ppm) unless otherwise stated

Sample Matrix: Water

Client Sample ID:

Lab Sample ID:

COMPOSITE

SS5236/SS5237/SS5238/SS5239

Date of Analysis

acidity, as CaCO ₃	86	02/10/92
alkalinity, as CaCO ₃	276	02/10/92
ammonia, as N	0.7	02/13/92
biochemical oxygen demand	14	02/08/92
chemical oxygen demand	57	02/19/92
total Kjeldahl nitrogen	3.3	02/20/92
pH (standard units)	6.30	02/08/92
specific conductance (μmhos/cm)	490	02/10/92
total dissolved solids	290	02/12/92
total solids	500	02/12/92
total suspended solids	170	02/12/92

Appendix C

Initial and Final Analytical Data from Batch Groundwater Treatment



INTERNATIONAL
TECHNOLOGY
CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: Duane Graves

April 7, 1992

Job Number: ITEK 50888

P.O. Number: 408474.02

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	03/11/92
Number of Samples:	Six (6)
Sample Type:	Water

I. Introduction

On 03/11/92, six (6) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from IT Corporation, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:

Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITEK 50888

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs went well. Sample TOE and TOD were given additional dilution after encountering some high levels in initial runs, while TOF was run at dilution only because of expected levels. In the TIC analysis, we noted some peaks that were either lab background or obvious carryover in the dilution of sample TOE, and did not report these artifacts. Some analytes reported as TICs were actually quantitated with full standardization. For these compounds, the results were listed without the J qualifier, unless the value was below quantitation limit.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a VG TRIO-2 GC/MS/DS. The sample runs met some problems. Each initial extract run showed a large peak for bis (2-ethylhexyl) phthalate, which appeared to be causing a matrix effect lowering of one internal standard (chrysene-D12) recovery, as well as generally obscuring chromatography in its region. Because of this, manual integration and rechecking for targets were done in that area, and a nearby, unaffected internal standard (phenanthrene-D10) was used as a reference for quantitation. Dilutions were run of the extracts; correcting the matrix effect, and quantitation by the usual internal standard references was possible, and performed. In the TIC analysis, some peaks were "smeared" or split, and the analyst used judgement in distinguishing and omitting peaks belonging to the volatiles fraction. TIC peaks found that had available standardization were reported as for the volatiles. No TICs were found or reported in the dilutions. There were no problems seen in final data review.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB03112

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	3 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/11/92

This method blank applies to the following sample: TOD.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: VB03112

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOD
Lab Sample ID: SS7315

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	27,000 D
chlorobenzene	5 U	methylene chloride	7 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	16
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 03/11/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOD
Lab Sample ID: SS7315

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
3-pentanone, 2,4-dimethyl-	14
benzene, (1-methylethyl)-	460
xylene (total)	32,000 D
benzene, propyl-	9.0
benzene, -ethyl-methyl-	73 Y

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- D - Compound analyzed at a secondary dilution factor.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: VB03122

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	2 J
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/12/92

This method blank applies to the following samples: TOD DL and TOE.

DL - Dilution

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: VB03122

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOE
Lab Sample ID: SS7316

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	6	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	23,000 DB
chlorobenzene	5 U	methylene chloride	8 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	19
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 03/12/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOE
Lab Sample ID: SS7316

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
acetone	30
3-pentanone, 2,4-dimethyl-	13
xylene (total)	31,000 D
benzene, methylethyl-	230 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

D - Compound analyzed at a secondary dilution factor.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: VB0313

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	1 J
chlorobenzene	5 U	methylene chloride	1 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/13/92

This method blank applies to the following sample: TOE DL.

DL - Dilution

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3
Lab Sample ID: VB0313

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 4

Lab Sample ID: VB03162

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	2 J
chlorobenzene	5 U	methylene chloride	1 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/16/92

This method blank applies to the following sample: TOF.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 4

Lab Sample ID: VB03162

Tentative Identification (1)

Concentration (2)

xylene (total)

2

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOF
Lab Sample ID: SS7317DR4

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	2,000 U	1,1-dichloroethene	1,000 U
acrylonitrile	2,000 U	cis-1,2-dichloroethene	1,000 U
benzene	1,000 U	trans-1,2-dichloroethene	1,000 U
bromodichloromethane	1,000 U	1,2-dichloropropane	1,000 U
bromoform	1,000 U	cis-1,3-dichloropropene	1,000 U
bromomethane	2,000 U	trans-1,3-dichloropropene	1,000 U
carbon tetrachloride	1,000 U	ethyl benzene	28,000 B
chlorobenzene	1,000 U	methylene chloride	310 BJ
chloroethane	2,000 U	1,1,2,2-tetrachloroethane	1,000 U
2-chloroethylvinyl ether	2,000 U	tetrachloroethene	1,000 U
chloroform	1,000 U	toluene	1,000 U
chloromethane	2,000 U	1,1,1-trichloroethane	1,000 U
dibromochloromethane	1,000 U	1,1,2-trichloroethane	1,000 U
1,1-dichloroethane	1,000 U	trichloroethene	1,000 U
1,2-dichloroethane	1,000 U	trichlorofluoromethane	1,000 U
		vinyl chloride	2,000 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 03/16/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOF
Lab Sample ID: SS7317DR4

Tentative Identification (1)

Concentration (2)

xylene (total)

42,000 B

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

B - Analyte was found in the blank as well as the sample.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

WATER SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(88-110%)*</u>	<u>BFB</u> <u>(86-115%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(76-114%)*</u>
TOD	96	95	87
TOD DL	99	103	95
TOE	101	103	89
TOE DL	89	96	98
TOF	98	103	83
Method Blank 1	91	94	89
Method Blank 2	94	95	90
Method Blank 3	100	97	98
Method Blank 4	96	95	84

*Values in parenthesis represent USEPA contract required QC limits.

DL - Dilution

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0040

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/13/92
Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: H0040

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/13/92

Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0040

Tentative Identification (1)

unknown

Concentration (2)

9.8

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOA
Lab Sample ID: SS7318

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	54,000 D
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	4 J	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/13/92
Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOA
Lab Sample ID: SS7318

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	38	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/13/92

Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOA
Lab Sample ID: SS7318

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (methylethyl)	140 Y
benzene, ethyl-methyl-	47 Y
benzene, (trimethyl)	35 Y
1-butanol, 3-methyl-, benzoa	51
ethanone, 1-phenyl-	32
benzene, trimethyl-	32 Y
benzene, trimethyl-	27 Y
propanoic acid, 2-methyl-, 1	31
phosphoric acid, 2-ethylhexy	60
1,2-benzenedicarboxylic acid	52
1,2-benzenedicarboxylic acid	48
1,2-benzenedicarboxylic acid	44
unknown	16
1,2-benzenedicarboxylic acid	42
unknown (alkane)	14
1-decanol, 2-ethyl-	13
unknown	13
benzenemethanol, .alpha. -ME	71
2,4-dimethylphenol	39

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOB
Lab Sample ID: SS7319

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	46,000 D
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/13/92
Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOB
Lab Sample ID: SS7319

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	17	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/13/92

Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOB
Lab Sample ID: SS7319

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (methylethyl)	140 Y
unknown	77
1,2-benzenedicarboxylic acid	180
benzene, ethyl-methyl-	35 Y
ethanone, 1-phenyl-	34
phosphoric acid, 2-ethylhexy	68
benzene, trimethyl-	25 Y
benzene, trimethyl-	20 Y
1-butanol, 3-methyl-, benzoa	17
propanoic acid, 2-methyl-, 1	15
phenol, ethyl-	12
1,2-benzenedicarboxylic acid	20
1,2-benzenedicarboxylic acid	20
1,2-benzenedicarboxylic acid	17
1,2-benzenedicarboxylic acid	17
unknown (alkane)	11
benzenemethanol, .alpha. -ME	69
2,4-dimethylphenol	45

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOC
Lab Sample ID: SS7320

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	22,000 D
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	3 J	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/13/92
Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOC
Lab Sample ID: SS7320

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	30	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/13/92

Date of Analysis: 03/26/92

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: TOC
Lab Sample ID: SS7320

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (methylethyl)	140 Y
1,2-benzenedicarboxylic acid	97
benzene, ethyl-methyl-	40 Y
benzene, trimethyl-	33 Y
ethanone, 1-phenyl-	32
benzene, trimethyl-	31 Y
1-butanol, 3-methyl-, benzoa	39
propanoic acid, 2-methyl-, 1	23
phosphoric acid, 2-ethylhexy	60
benzene, trimethyl-	23 Y
1,2-benzenedicarboxylic acid	52
1,2-benzenedicarboxylic acid	47
phenol, ethyl-	14 Y
unknown	33
unknown	13
unknown (alkane)	12
unknown	12
phenol, dimethyl-	9.9 Y
benzenemethanol, .alpha. -ME	77
2,4-dimethylphenol	44

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
April 7, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 50888

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>
TOA	76	90	60
TOA DL	0 D	0 D	0 D
TOB	79	92	54
TOB DL	0 D	0 D	0 D
TOC	75	92	54
TOC DL	0 D	0 D	0 D
Method Blank	75	91	91

*Values in parenthesis represent USEPA contract required QC limits.

D - Surrogates diluted out.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: Duane Graves

May 6, 1992

Job Number: ITEK 51037

P.O. Number: 408474.02

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	03/31/92
Number of Samples:	Fifteen (15)
Sample Type:	Water

I. Introduction

On 03/31/92, fifteen (15) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from IT Corporation, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

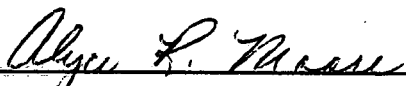
II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:



Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITEK 51037

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS 500 GC/MS/DS. The sample runs went well. The analysts noted that all bottles received contained headspace. In the TIC analysis, it was found that some analytes (4-methyl-2-pentanone and dimethylbenzene) had been detected, which had been included in the standard. The standard response was used for quantitation in these cases, which produces more accurate values than the usual estimation method. In general, the results were seen to be comparable. The data were reported with J qualifiers as are other TICs. Several samples required additional dilutions. Sample 4A-TF showed a moderate elevation of one surrogate recovery in an undiluted run. This was probably due to matrix effect from high levels. Both of the run data were reported for comparison. Acetonitrile was seen in a method blank, and was recognized as carryover from a standard solvent. This did not interfere with the analysis.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. The sample runs went well. Additional dilutions were necessary to adequately quantitate all analytes. In some cases, terphenyl-D14 surrogate recovery was reported outside acceptable QC limits, but not so as to affect overall sample compliance. In other cases, dilutions required were high enough that surrogates were not reported. For all samples, extraction was begun with 500 ml diluted to 1 liter in reagent water, because of limited volume. The extracts were initially run at twofold bench dilution. Bis-2-ethylhexyl phthalate is a ubiquitous lab contaminant, but the levels seen, and its absence in the method blank, strongly indicate it was sample intrinsic. There were no other problems seen in final data review.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1A-TF

Lab Sample ID: SS8682

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	4 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1A-TF
Lab Sample ID: SS8682

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1B-TF

Lab Sample ID: SS8683R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1B-TF
Lab Sample ID: SS8683

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1C-TF

Lab Sample ID: SS8684

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1C-TF
Lab Sample ID: SS8684

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2A-TF

Lab Sample ID: SS8685

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	1 J	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2A-TF
Lab Sample ID: SS8685

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2B-TF

Lab Sample ID: SS8686

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2B-TF
Lab Sample ID: SS8686

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2C-TF

Lab Sample ID: SS8687

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2C-TF
Lab Sample ID: SS8687

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3A-TF

Lab Sample ID: SS8688

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	3 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3A-TF
Lab Sample ID: SS8688

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3B-TF

Lab Sample ID: SS8689

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	4 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3B-TF

Lab Sample ID: SS8689

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3C-TF

Lab Sample ID: SS8690

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3C-TF
Lab Sample ID: SS8690

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4A-TF

Lab Sample ID: SS8691

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	400 E	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	6,500 D
carbon tetrachloride	5 U	methylene chloride	7 B
chlorobenzene	160	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	8
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.
E - Compound exceeded calibration range of instrument.

Date of Analysis: 04/02/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4A-TF
Lab Sample ID: SS8691

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
4-methyl-2-pentanone	400 J
benzene, dimethyl	1,000 JY
benzene, 1,2-dimethyl	4,100 J
1,3,5-cycloheptatriene, 7-ethyl-	120 J
1,3,5-cycloheptatriene, 7-ethyl-	16 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4B-TF

Lab Sample ID: SS8692

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	54	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	3,600 D
carbon tetrachloride	5 U	methylene chloride	7
chlorobenzene	70	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/03/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4B-TF
Lab Sample ID: SS8692

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
3-pentanone, 2,4-dimethyl	4 J
benzene, dimethyl	750 JY
benzene, 1,2-dimethyl	2,800 J
1,3,5-cycloheptatriene, 7-ethyl-	24 J
1,3,5-cycloheptatriene, 7-ethyl-	3 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4C-TF
Lab Sample ID: SS8693

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	100 U	1,1-dichloroethene	50 U
acrylonitrile	100 U	trans-1,2-dichloroethene	50 U
benzene	250	1,2-dichloropropane	50 U
bromodichloromethane	50 U	cis-1,3-dichloropropene	50 U
bromoform	50 U	trans-1,3-dichloropropene	50 U
bromomethane	100 U	ethyl benzene	7,500 D
carbon tetrachloride	50 U	methylene chloride	16 JB
chlorobenzene	96 J	1,1,2,2-tetrachloroethane	50 U
chloroethane	100 U	tetrachloroethene	50 U
2-chloroethylvinyl ether	100 U	toluene	50 U
chloroform	50 U	1,1,1-trichloroethane	50 U
chloromethane	100 U	1,1,2-trichloroethane	50 U
dibromochloromethane	50 U	trichloroethene	50 U
1,1-dichloroethane	50 U	trichlorofluoromethane	50 U
1,2-dichloroethane	50 U	vinyl chloride	100 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/03/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4C-TF
Lab Sample ID: SS8693

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl	690 JY
benzene, 1,2-dimethyl	8,700 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5A-TF

Lab Sample ID: SS8694

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	100 U	1,1-dichloroethene	50 U
acrylonitrile	100 U	trans-1,2-dichloroethene	50 U
benzene	50 U	1,2-dichloropropane	50 U
bromodichloromethane	50 U	cis-1,3-dichloropropene	50 U
bromoform	50 U	trans-1,3-dichloropropene	50 U
bromomethane	100 U	ethyl benzene	14,000 D
carbon tetrachloride	50 U	methylene chloride	18 JB
chlorobenzene	50 U	1,1,2,2-tetrachloroethane	50 U
chloroethane	100 U	tetrachloroethene	50 U
2-chloroethylvinyl ether	100 U	toluene	11 J
chloroform	50 U	1,1,1-trichloroethane	50 U
chloromethane	100 U	1,1,2-trichloroethane	50 U
dibromochloromethane	50 U	trichloroethene	50 U
1,1-dichloroethane	50 U	trichlorofluoromethane	50 U
1,2-dichloroethane	50 U	vinyl chloride	100 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/03/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5A-TF
Lab Sample ID: SS8694

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl	1,800 JY
benzene, 1,2-dimethyl	14,000 J

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- J - Indicates an estimated value less than the detection limit.
- Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5B-TF

Lab Sample ID: SS8695

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	100 U	1,1-dichloroethene	50 U
acrylonitrile	100 U	trans-1,2-dichloroethene	50 U
benzene	50 U	1,2-dichloropropane	50 U
bromodichloromethane	50 U	cis-1,3-dichloropropene	50 U
bromoform	50 U	trans-1,3-dichloropropene	50 U
bromomethane	100 U	ethyl benzene	15,000 D
carbon tetrachloride	50 U	methylene chloride	19 JB
chlorobenzene	50 U	1,1,2,2-tetrachloroethane	50 U
chloroethane	100 U	tetrachloroethene	50 U
2-chloroethylvinyl ether	100 U	toluene	13 J
chloroform	50 U	1,1,1-trichloroethane	50 U
chloromethane	100 U	1,1,2-trichloroethane	50 U
dibromochloromethane	50 U	trichloroethene	50 U
1,1-dichloroethane	50 U	trichlorofluoromethane	50 U
1,2-dichloroethane	50 U	vinyl chloride	100 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/03/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5B-TF
Lab Sample ID: SS8695

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl	1,900 JY
benzene, 1,2-dimethyl	14,000 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5C-TF (1:100 Dilution)

Lab Sample ID: SS8696

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,000 U	1,1-dichloroethene	500 U
acrylonitrile	1,000 U	trans-1,2-dichloroethene	500 U
benzene	500 U	1,2-dichloropropane	500 U
bromodichloromethane	500 U	cis-1,3-dichloropropene	500 U
bromoform	500 U	trans-1,3-dichloropropene	500 U
bromomethane	1,000 U	ethyl benzene	15,000
carbon tetrachloride	500 U	methylene chloride	210 J
chlorobenzene	500 U	1,1,2,2-tetrachloroethane	500 U
chloroethane	1,000 U	tetrachloroethene	500 U
2-chloroethylvinyl ether	1,000 U	toluene	500 U
chloroform	500 U	1,1,1-trichloroethane	500 U
chloromethane	1,000 U	1,1,2-trichloroethane	500 U
dibromochloromethane	500 U	trichloroethene	500 U
1,1-dichloroethane	500 U	trichlorofluoromethane	500 U
1,2-dichloroethane	500 U	vinyl chloride	1,000 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5C-TF (1:100 Dilution)

Lab Sample ID: SS8696

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	1,900 Y
benzene, 1,2-dimethyl-	25,000 Y

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB0402

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/02/92

This method blank applies to the following samples: 1A-TF, 1B-TF, 1C-TF, 2A-TF, 2B-TF, 2C-TF and 3A-TF.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB0402

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: WB04023

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/02/92

This method blank applies to the following samples: 3B-TF, 3C-TF and 4A-TF.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: WB04023

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: WB0403

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/03/92

This method blank applies to the following samples: 4A-TF DL, 4A-TF DL2, 4B-TF and 4C-TF DL.

DL = Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3
Lab Sample ID: WB0403

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 4

Lab Sample ID: WB04032

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/03/92

This method blank applies to the following samples: 4B-TF DL, 4C-TF, 5A-TF, 5A-TF DL, 5B-TF and 5B-TF DL.

DL = Dilution

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 4
Lab Sample ID: WB04032

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 5

Lab Sample ID: WB0406

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	5 U
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/06/92

This method blank applies to the following sample: 5C-TF.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 5

Lab Sample ID: WB0406

Tentative Identification (1)

Concentration (2)

acetonitrile

54

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

WATER SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	VOLATILE		
	Toluene-D8 (88-110%)*	BFB (86-115%)*	1,2 Dichloroethane-D4 (76-114%)*
1A-TF	105	99	94
1B-TF	96	95	94
1C-TF	103	101	99
2A-TF	99	97	96
2B-TF	95	91	93
2C-TF	99	96	95
3A-TF	97	94	92
3B-TF	97	92	89
3C-TF	104	98	93
4A-TF	113 **	110	109
4A-TF DL	103	102	81
4A-TF DL2	105	110	105
4B-TF	103	102	102
4B-TF DL	96	96	91
4C-TF	101	102	96
4C-TF DL	96	99	98

*Values in parenthesis represent QC limits.

**Values are outside of QC limits.

DL - Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

WATER SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(88-110%)*</u>	<u>BFB</u> <u>(86-115%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(76-114%)*</u>
5A-TF	99	102	94
5A-TF DL	89	91	86
5B-TF	97	101	93
5B-TF DL	102	102	95
5C-TF	95	102	98
Method Blank 1	99	96	94
Method Blank 2	108	105	99
Method Blank 3	100	101	99
Method Blank 4	94	94	93
Method Blank 5	99	94	93

*Values in parenthesis represent QC limits.

DL - Dilution

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1A-TF
Lab Sample ID: SS8682

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	110
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1A-TF
Lab Sample ID: SS8682

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1A-TF
Lab Sample ID: SS8682

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1B-TF
Lab Sample ID: SS8683

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	200
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1B-TF
Lab Sample ID: SS8683

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1B-TF
Lab Sample ID: SS8683

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1C-TF

Lab Sample ID: SS8684

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	180
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92

Date of Analysis: 04/06/92

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1C-TF
Lab Sample ID: SS8684

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1C-TF
Lab Sample ID: SS8684

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2A-TF

Lab Sample ID: SS8685

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	1,800 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	6 J	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92

Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2A-TF

Lab Sample ID: SS8685

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/03/92

Date of Analysis: 04/06/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2A-TF
Lab Sample ID: SS8685

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-butanone, 4-(dimethylamino)-3-methyl-	23 J
unknown	35 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2B-TF
Lab Sample ID: SS8686

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	1,000 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92
Date of Analysis: 04/07/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2B-TF
Lab Sample ID: SS8686

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/07/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2B-TF
Lab Sample ID: SS8686

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-butanone, 4-(dimethylamino)-3-methyl-	18 J
unknown	25 J
unknown	24 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2C-TF
Lab Sample ID: SS8687

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	1,900 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	4 J	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92
Date of Analysis: 04/07/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2C-TF
Lab Sample ID: SS8687

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/07/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 2C-TF
Lab Sample ID: SS8687

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-butanone, 4-(dimethylamino)-3-methyl-	26 J
unknown	40 J
unknown	18 J

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3A-TF

Lab Sample ID: SS8688

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	150
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92

Date of Analysis: 04/07/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3A-TF
Lab Sample ID: SS8688

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/07/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3A-TF
Lab Sample ID: SS8688

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-methyl-
unknown

17 JAB
21 J

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol product.
B - Analyte was found in the blank as well as the sample.
J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3B-TF

Lab Sample ID: SS8689

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	86
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3B-TF
Lab Sample ID: SS8689

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3B-TF
Lab Sample ID: SS8689

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3C-TF
Lab Sample ID: SS8690

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	27
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92
Date of Analysis: 04/18/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3C-TF
Lab Sample ID: SS8690

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/18/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 3C-TF
Lab Sample ID: SS8690

Tentative Identification (1)

Concentration (2)

NONE DETECTED

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4A-TF

Lab Sample ID: SS8691

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	11,000 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- J - Indicates an estimated value less than the detection limit.
- D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4A-TF
Lab Sample ID: SS8691

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	4 J	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4A-TF
Lab Sample ID: SS8691

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	20 J
benzaldehyde	32 J
benzenemethanol, .alpha.-methyl-	24 J
2-propenal, 3-phenyl-	24 J
unknown (phthalate)	48 J

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4B-TF
Lab Sample ID: SS8692

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	3,400 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92
Date of Analysis: 04/18/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4B-TF
Lab Sample ID: SS8692

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4B-TF
Lab Sample ID: SS8692

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	21 J
benzaldehyde	49 J
benzenemethanol, .alpha.-methyl-	36 J
methyl benzaldehyde	22 JY
2-propenal, 3-phenyl-	31 J
unknown (phthalate)	21 J

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4C-TF

Lab Sample ID: SS8693

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	3,400 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4C-TF
Lab Sample ID: SS8693

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/18/92

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 4C-TF
Lab Sample ID: SS8693

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	21 J
benzaldehyde	60 J
benzenemethanol, .alpha.-methyl-	28 J
methyl benzaldehyde	41 JY
2-propenal, 3-phenyl-	65 J
unknown (phthalate)	21 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.
Y - Indistinguishable isomer in tentatively identified compounds.

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5A-TF

Lab Sample ID: SS8694

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	4,200 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92

Date of Analysis: 04/18/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5A-TF
Lab Sample ID: SS8694

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/18/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5A-TF
Lab Sample ID: SS8694

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	46 J
benzenemethanol, .alpha.-methyl-	33 J
ethanone, 1-phenyl-	88 J
phenol, 2-ethyl-	24 J
unknown (phthalate)	23 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5B-TF
Lab Sample ID: SS8695

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	5,000 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92
Date of Analysis: 04/20/92

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5B-TF
Lab Sample ID: SS8695

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	20 U	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/20/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5B-TF
Lab Sample ID: SS8695

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	41 J
benzenemethanol, .alpha.-methyl-	43 J
ethanone, 1-phenyl-	66 J
unknown (phthalate)	27 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5C-TF
Lab Sample ID: SS8696

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	20 U	bis(2-chloroisopropyl)ether	20 U
acenaphthylene	20 U	bis(2-ethylhexyl)phthalate	9,200 D
anthracene	20 U	4-bromophenyl phenyl ether	20 U
benzidine	100 U	2-chloronaphthalene	20 U
benzo(a)anthracene	20 U	4-chlorophenyl phenyl ether	20 U
benzo(b)fluoranthene	20 U	chrysene	20 U
benzo(k)fluoranthene	20 U	dibenz(a,h)anthracene	20 U
benzo(a)pyrene	20 U	di-n-butylphthalate	20 U
benzo(g,h,i)perylene	20 U	1,2-dichlorobenzene	20 U
butylbenzylphthalate	20 U	1,3-dichlorobenzene	20 U
bis(2-chloroethoxy)methane	20 U	1,4-dichlorobenzene	20 U
bis(2-chloroethyl)ether	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 04/03/92
Date of Analysis: 04/20/92

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5C-TF
Lab Sample ID: SS8696

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	40 U	hexachloroethane	20 U
diethylphthalate	20 U	indeno(1,2,3-cd)pyrene	20 U
dimethyl phthalate	20 U	isophorone	20 U
2,4-dinitrotoluene	20 U	naphthalene	20 U
2,6-dinitrotoluene	20 U	nitrobenzene	20 U
di-n-octyl phthalate	6 J	n-nitroso-di-n-propylamine	20 U
1,2-diphenylhydrazine(1)	20 U	n-nitrosodimethylamine	20 U
fluoranthene	20 U	n-nitrosodiphenylamine(2)	20 U
fluorene	20 U	phenanthrene	20 U
hexachlorobenzene	20 U	pyrene	20 U
hexachlorobutadiene	20 U	1,2,4-trichlorobenzene	20 U
hexachlorocyclopentadiene	20 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/20/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 5C-TF
Lab Sample ID: SS8696

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	61 J
benzenemethanol, .alpha.-methyl-	32 J
ethanone, 1-phenyl-	99 J
phenol, 2-ethyl-	19 J
phosphoric acid, 2-ethylhexyl diphenyl ester	16 J
unknown (phthalate)	61 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

J - Indicates an estimated value less than the detection limit.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: BL0203

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

This method blank applies to the following samples: 1A-TF, 1B-TF, 1C-TF, 2A-TF, 2A-TF DL, 2B-TF, 2B-TF DL, 2C-TF, 2C-TF DL, 3A-TF, 3B-TF, 3C-TF, 4A-TF, 4A-TF DL, 4B-TF, 4B-TF DL, 4C-TF, 4C-TF DL, 5A-TF, 5A-TF DL, 5B-TF, 5B-TF DL, 5C-TF and 5C-TF DL.

DL = Dilution

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: BL0203

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/03/92
Date of Analysis: 04/06/92

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May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: BL0203

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-methyl-
unknown

11 JA
8.6 J

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol product.
J - Indicates an estimated value less than the detection limit.

Client Project ID: LE Carpenter

Job Number: ITEK 51037

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1A-TF	80	83	64	NA	NA	NA
1B-TF	77	82	64	NA	NA	NA
1C-TF	78	85	72	NA	NA	NA
2A-TF	71	69	32 **	NA	NA	NA
2A-TF DL	70	65	30 **	NA	NA	NA
2B-TF	79	71	34	NA	NA	NA
2B-TF DL	77	65	31 **	NA	NA	NA
2C-TF	86	79	40	NA	NA	NA
2C-TF DL	75	73	38	NA	NA	NA
3A-TF	85	85	65	NA	NA	NA
3B-TF	82	82	64	NA	NA	NA
3C-TF	78	78	64	NA	NA	NA
4A-TF	82	85	59	NA	NA	NA
4A-TF DL	D	D	D	NA	NA	NA
4B-TF	85	88	55	NA	NA	NA
4B-TF DL	D	D	D	NA	NA	NA
4C-TF	78	84	63	NA	NA	NA
4C-TF DL	D	D	D	NA	NA	NA

*Values in parenthesis represent QC limits.

**Values are outside of QC limits.

D - Surrogates diluted out
NA - Not applicable
DL - Dilution

IT Corporation
May 6, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITEK 51037

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
5A-TF	79	85	49	NA	NA	NA
5A-TF DL	D	D	D	NA	NA	NA
5B-TF	77	84	44	NA	NA	NA
5B-TF DL	D	D	D	NA	NA	NA
5C-TF	75	85	54	NA	NA	NA
5C-TF DL	D	D	D	NA	NA	NA
Method Blank	94	95	96	NA	NA	NA

*Values in parenthesis represent QC limits.

D - Surrogates diluted out
NA - Not applicable
DL - Dilution

Appendix D

Geotechnical Data

CERTIFICATE OF ANALYSIS

Michael Krstich
IT Corporation
312 Directors Drive
Knoxville, Tn. 37923

May 14, 1992

ETDC Project Number: 483500.004.01

P.O. Number: 483048

This is the Certificate of Analysis for the following samples:

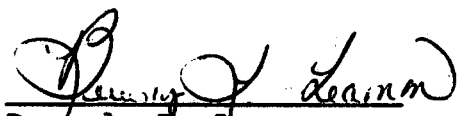
Client Project ID: L.E. Carpenter
Date Received by Lab: April 8, 1992
Number of Samples: Six (6)
Sample Type: Soil

I. Introduction/Case Narrative

Six soil samples were received by IT/ETDC on April 8, 1992 for analysis of grainsize distribution, moisture content, unit weight density, organic content, atterberg limits, specific gravity, permeability and porosity.

Please see Appendix A, the sample number cross reference list; Appendix B, the analysis results; and Appendix C, the Chain of Custody and Request for Analysis records.

Reviewed and Approved:



Beverly L. Deamon
Manager, Geotechnical Services

II. Analytical Results/Methodology

REFERENCES: Army Corps of Engineers laboratory Soils Testing, EM1110-2-1906; EPA SW-846, Test Methods for Evaluating Solid Waste. Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics. Volume 4.02, Concrete and Aggregates.

Unit Weight Density & Porosity	EM1110-2-1906
Permeability	SW846, Method 9100
Grainsize Distribution	ASTM D 422
Moisture Content	ASTM D 2216
Atterberg Limits	ASTM D 4318
Ash & Organic Content	ASTM D 2974
Specific Gravity	ASTM D 854/ASTM C 127

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due to the inability of obtaining samples with known characteristics, the heterogeneous nature of the samples, and Quality Control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification on all numerical results - all raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, many analyses routinely call for a re-analysis, specifying an acceptance criteria.
- Routine instrument calibration - all instruments, gauges and equipment used in testing is calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

- Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.
- Use of trained personnel for conducting tests - all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by IT.

IV. Data Qualification

Michael Krstich of IT/Knoxville requested geotechnical test parameters on six of the thirteen samples received by IT/ETDC. Samples were sent to IT/ETDC as a group, so they could be returned together to their site of origin after geotechnical testing was completed. Geotechnical testing was requested and completed on client sample numbers ST-2A/24-48, ST-2A/48-72, ST-2B/24-48, ST-2B/72-96, ST-3A/0-24 and ST-3B/24-48 (ETDC numbers: 1993-1995 and 1997-1999). Client sample number ST-2B/48-72 (ETDC-1996) lacked sufficient sample quantity to complete all of the originally requested geotechnical test parameters. With the knowledge and approval of Michael Krstich, client sample number ST-3B/24-48 (ETDC-1999) was substituted in place of client sample number ST-2B/48-72 (ETDC-1996) for geotechnical analysis testing.

Average specific gravity values are calculated based on an average of the bulk specific gravity* and the specific gravity of material passing the #10 sieve. Average specific gravity values given on most data results mean that the sample was composed of particles which were smaller than the #4 sieve and a significant amount of material which was greater than the #4 sieve. Client sample number ST-3B/24-48 (ETDC-1999) was the only sample which did not contain a significant amount of material greater than the #4 sieve. The specific gravity value given on data results for ETDC-1999 represents the specific gravity of material passing the #10 sieve. The average specific gravity calculation is referenced from ASTM D 854 and ASTM C 127.

Fine sieve and hydrometer results occasionally overlap due to organic debris, soluble salts or other contaminants contained in the sample. Data points are plotted as calculated. No attempt has been made to curve-fit the grainsize data points.

*Bulk specific gravity is defined by the specific gravity of the material greater than the number 4 sieve (4.75 mm).

Page 4 of 16
Michael Krstich
IT Corporation
May 14, 1992

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Client Project ID: L.E. Carpenter ETDC Project No.: 483500.004.01

CROSS-REFERENCE LIST

ETDC SAMPLE NO.

CLIENT SAMPLE NO.

ETDC-1993.....	ST-2A/24-48
ETDC-1994.....	ST-2A/48-72
ETDC-1995.....	ST-2B/24-48
ETDC-1997.....	ST-2B/72-96
ETDC-1998.....	ST-3A/0-24
ETDC-1999.....	ST-3B/24-48

SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	ML
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	6.5
CUST. SAMPLE NO.:	ST-2A/24-48	LIQUID LIMIT:	26.0
ETDC SAMPLE NO.:	ETDC-1993	PLASTICITY INDEX:	2.0
AVG. SPECIFIC GRAVITY:	2.8201 (MEASURED)	PERMEABILITY:	5.1 E-5 cm/s
ORGANIC CONTENT, %:	5.3	UNIT WEIGHT DENSITY:	122.6 pcf
ASH CONTENT, %:	94.7	DRY DENSITY:	115.1 pcf
POROSITY:	34.6		

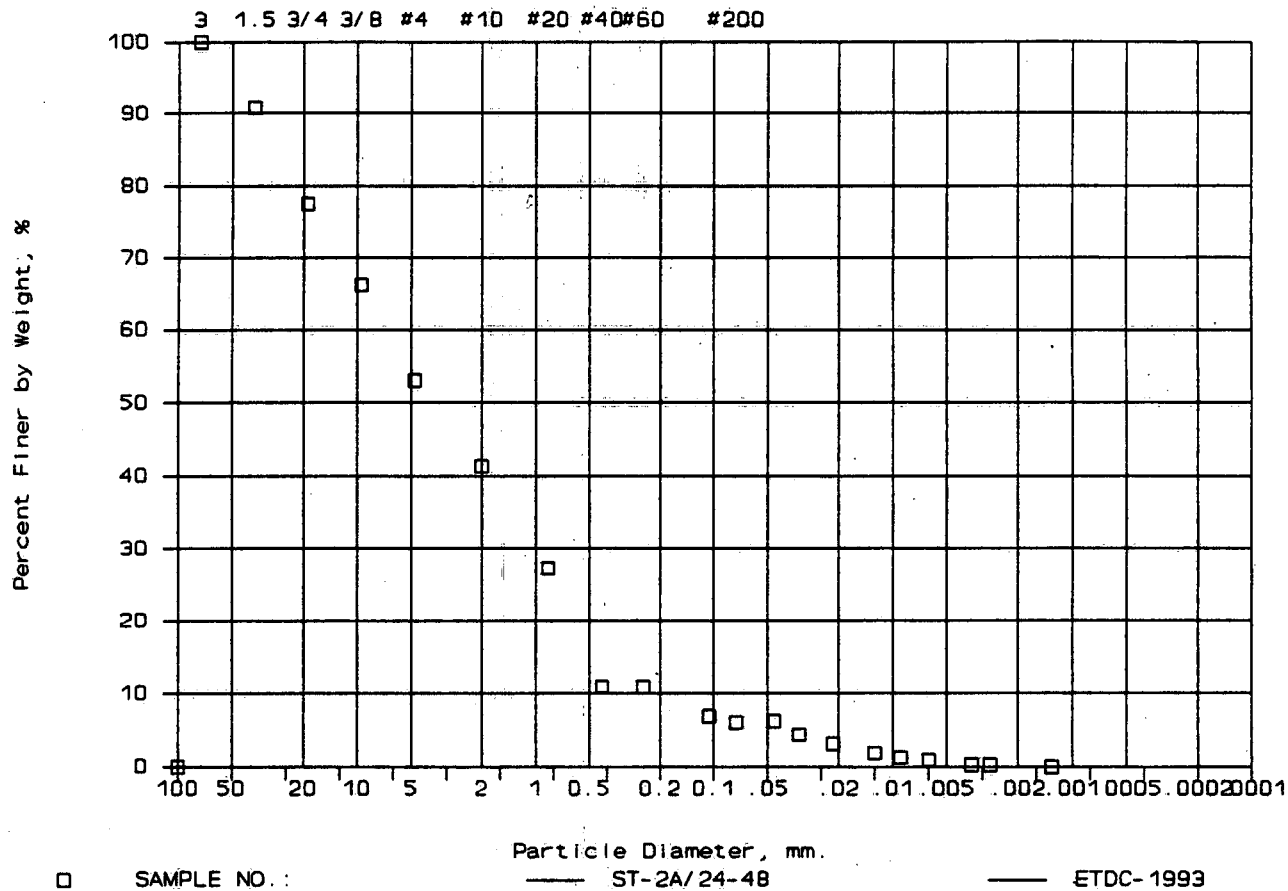
SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	90.8
0.75 in	19.000	77.5
0.375 in	9.500	66.2
NO. 4	4.750	53.0
NO. 10	2.000	41.4
NO. 20	0.850	27.2
NO. 40	0.425	10.9
NO. 60	0.250	10.9
NO. 140	0.106	6.9
NO. 200	0.075	6.0

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0457	6.2
0.0333	4.3
0.0215	3.1
0.0126	1.8
0.0090	1.2
0.0063	0.9
0.0036	0.3
0.0029	0.3
0.0013	0.0

L. E. CARPENTER



SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	*NP
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	15.1
CUST. SAMPLE NO.:	ST-2A/48-72	LIQUID LIMIT:	30.0
ETDC SAMPLE NO.:	ETDC-1994	PLASTICITY INDEX:	*NP
AVG. SPECIFIC GRAVITY:	2.5610 (MEASURED)	PERMEABILITY:	1.8 E-5 cm/s
ORGANIC CONTENT, %:	8.0	UNIT WEIGHT DENSITY:	60.6 pcf
ASH CONTENT, %:	92.0	DRY DENSITY:	52.6 pcf
POROSITY:	67.1		

=====SIEVE ANALYSIS=====

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	72.4
0.375 in	9.500	71.7
NO. 4	4.750	64.2
NO. 10	2.000	60.0
NO. 20	0.850	51.3
NO. 40	0.425	34.4
NO. 60	0.250	34.4
NO. 140	0.106	25.0
NO. 200	0.075	23.0

=====HYDROMETER ANALYSIS=====

DIAMETER (mm)	PERCENT FINER (%)
0.0460	15.5
0.0328	14.5
0.0213	12.6
0.0131	6.8
0.0095	4.4
0.0067	3.4
0.0039	2.9
0.0031	1.9
0.0014	0.5

NONPLASTIC



SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	*NP
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	6.6
CUST. SAMPLE NO.:	ST-2B/24-48	LIQUID LIMIT:	24.0
ETDC SAMPLE NO.:	ETDC-1995	PLASTICITY INDEX:	*NP
AVG. SPECIFIC GRAVITY:	2.9551 (MEASURED)	PERMEABILITY:	1.1 E-4 cm/s
ORGANIC CONTENT, %:	4.2	UNIT WEIGHT DENSITY:	99.7 pcf
ASH CONTENT, %:	95.8	DRY DENSITY:	93.5 pcf
POROSITY:	49.3		

SIEVE ANALYSIS

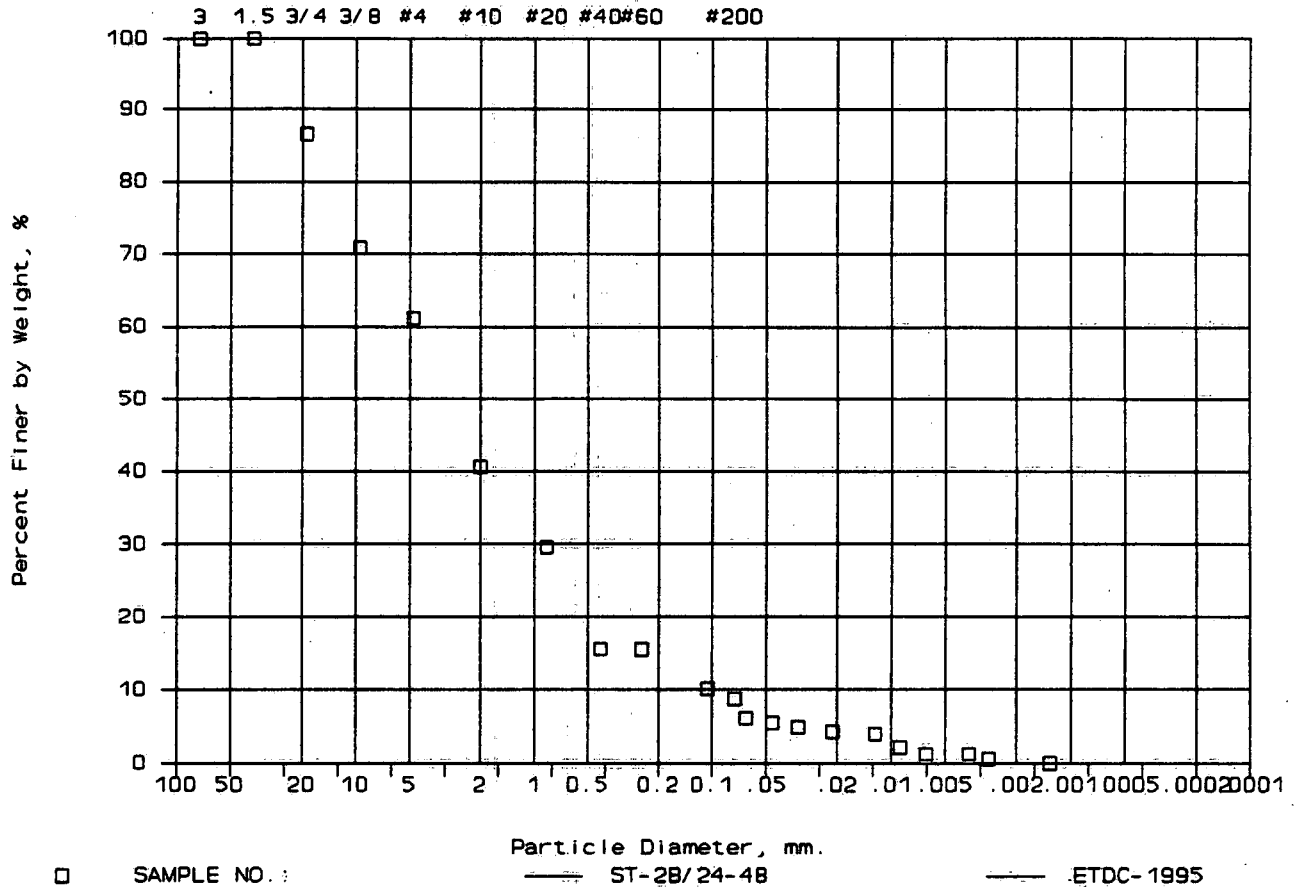
SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	86.5
0.375 in	9.500	70.8
NO. 4	4.750	61.2
NO. 10	2.000	40.6
NO. 20	0.850	29.5
NO. 40	0.425	15.6
NO. 60	0.250	15.5
NO. 140	0.106	10.1
NO. 200	0.075	8.8

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0647	6.1
0.0461	5.5
0.0330	4.9
0.0211	4.3
0.0122	4.0
0.0089	2.1
0.0064	1.2
0.0037	1.2
0.0029	0.6
0.0013	0.0

NONPLASTIC

L. E. CARPENTER



SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	ML
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	5.6
CUST. SAMPLE NO.:	ST-2B/72-96	LIQUID LIMIT:	23.0
ETDC SAMPLE NO.:	ETDC-1997	PLASTICITY INDEX:	1.0
AVG. SPECIFIC GRAVITY:	2.8363 (MEASURED)	PERMEABILITY:	1.4 E-4 cm/s
ORGANIC CONTENT, %:	3.8	UNIT WEIGHT DENSITY:	106.0 pcf
ASH CONTENT, %:	96.2	DRY DENSITY:	100.3 pcf
POROSITY:	43.3		

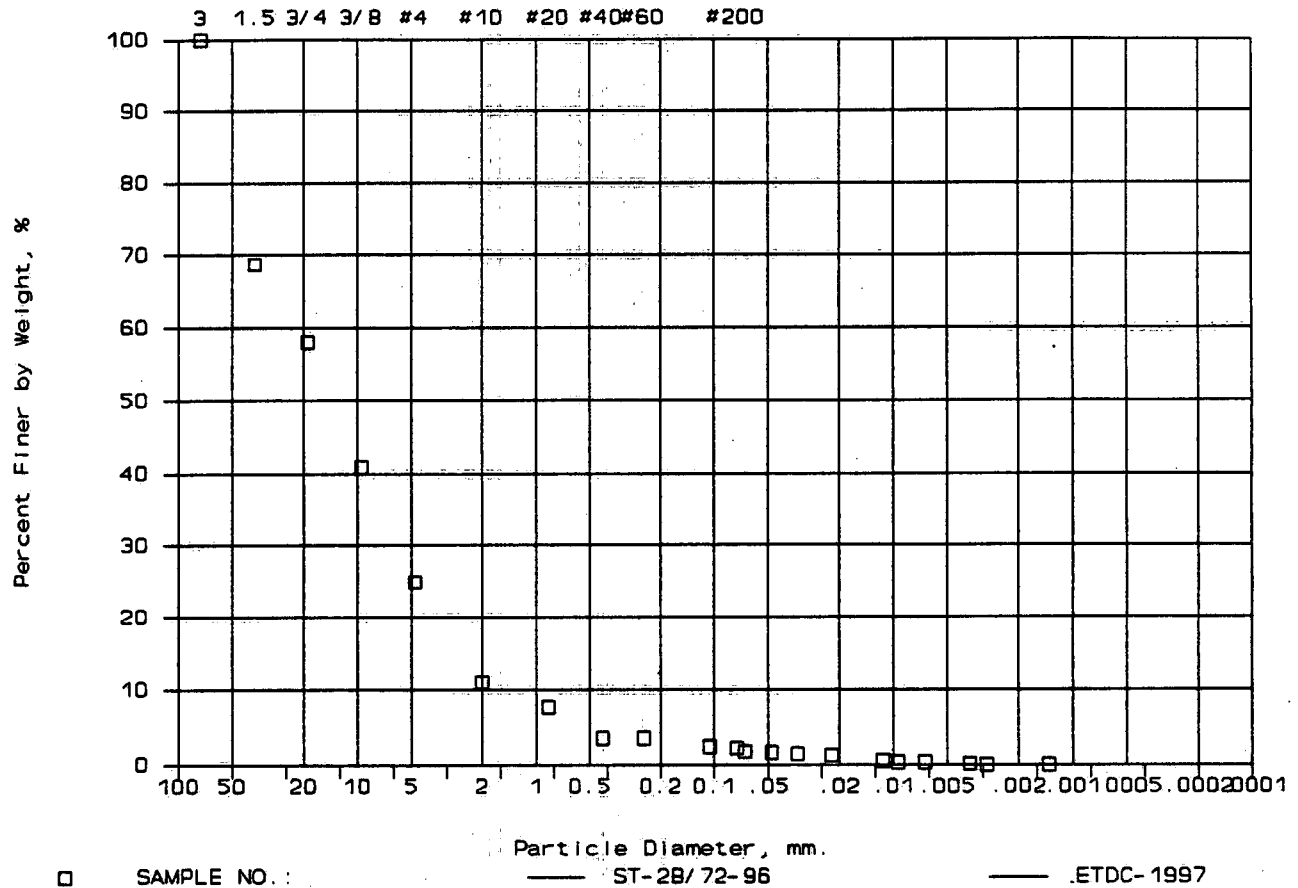
=====SIEVE ANALYSIS=====

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	68.7
0.75 in	19.000	58.0
0.375 in	9.500	41.0
NO. 4	4.750	24.8
NO. 10	2.000	11.0
NO. 20	0.850	7.6
NO. 40	0.425	3.6
NO. 60	0.250	3.6
NO. 140	0.106	2.4
NO. 200	0.075	2.2

=====HYDROMETER ANALYSIS=====

DIAMETER (mm)	PERCENT FINER (%)
0.0675	1.7
0.0479	1.6
0.0342	1.5
0.0220	1.2
0.0114	0.5
0.0094	0.3
0.0066	0.3
0.0037	0.1
0.0030	0.0
0.0014	0.0

L.E. CARPENTER



Page 13 of 16
Michael Krstich
IT Corporation
May 14, 1992

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Client Project ID: L.E. Carpenter ETDC Project No.: 483500.004.01

SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	CL
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	10.2
CUST. SAMPLE NO.:	ST-3A/0-24	LIQUID LIMIT:	20.0
ETDC SAMPLE NO.:	ETDC-1998	PLASTICITY INDEX:	3.0
AVG. SPECIFIC GRAVITY:	2.6320 (MEASURED)	PERMEABILITY:	3.3 E-5 cm/s
ORGANIC CONTENT, %:	3.4	UNIT WEIGHT DENSITY:	111.3 pcf
ASH CONTENT, %:	96.6	DRY DENSITY:	101.0 pcf
POROSITY:	38.5		

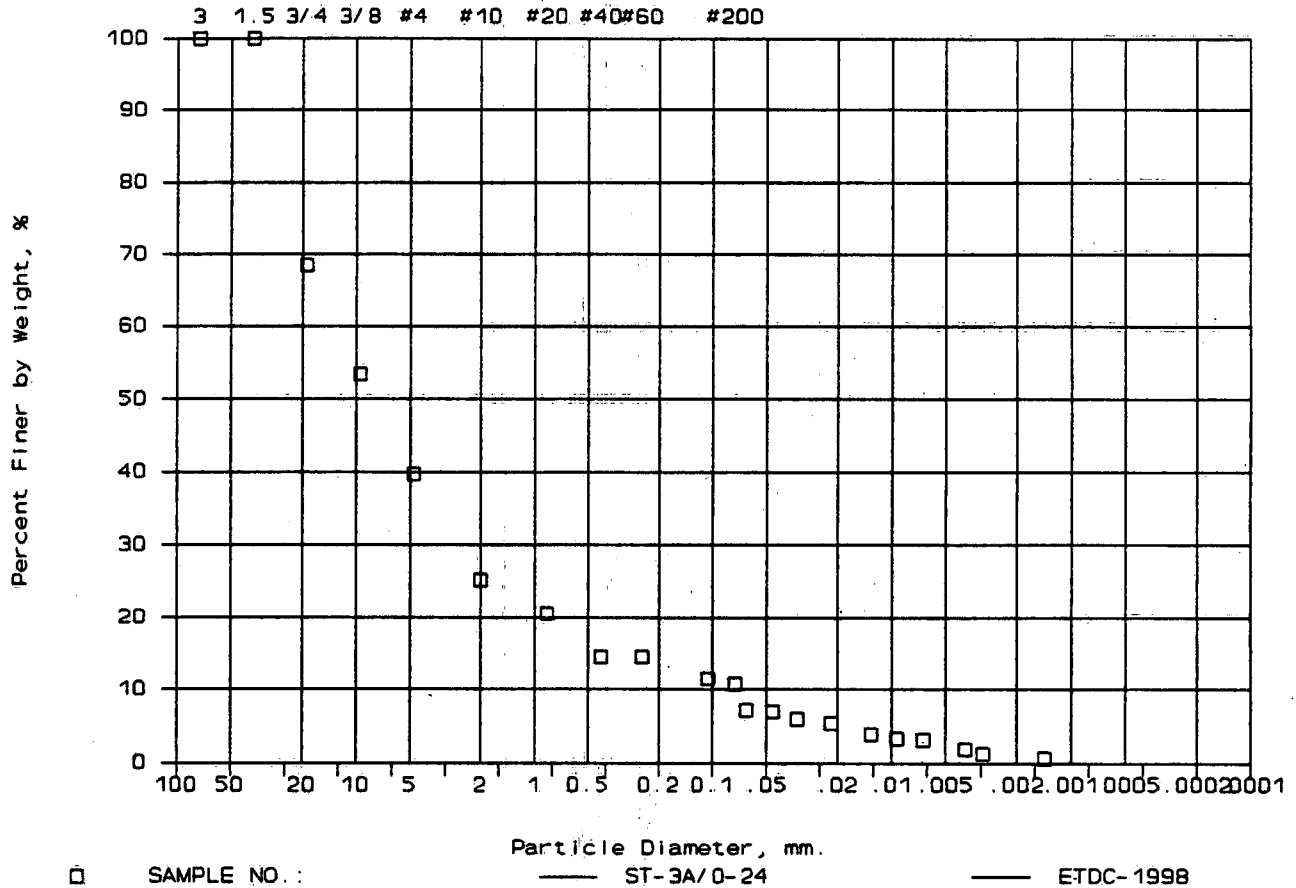
=====SIEVE ANALYSIS=====

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	68.5
0.375 in	9.500	53.5
NO. 4	4.750	39.7
NO. 10	2.000	25.1
NO. 20	0.850	20.6
NO. 40	0.425	14.5
NO. 60	0.250	14.5
NO. 140	0.106	11.4
NO. 200	0.075	10.8

=====HYDROMETER ANALYSIS=====

DIAMETER (mm)	PERCENT FINER (%)
0.0648	7.1
0.0461	6.9
0.0336	5.9
0.0216	5.3
0.0129	3.9
0.0093	3.3
0.0066	3.1
0.0039	1.8
0.0031	1.2
0.0014	0.6

L. E. CARPENTER



SAMPLE ANALYSIS RESULTS

PROJECT NAME:	L.E. CARPENTER	USCS SYMBOL:	*NP
PROJECT NO.:	483500.004.01	WATER CONTENT, %:	40.2
CUST. SAMPLE NO.:	ST-3B/24-48	LIQUID LIMIT:	30.0
ETDC SAMPLE NO.:	ETDC-1999	PLASTICITY INDEX:	*NP
SPECIFIC GRAVITY:	2.5174 (MEASURED)	PERMEABILITY:	5.6 E-6 cm/s
ORGANIC CONTENT, %:	4.3	UNIT WEIGHT DENSITY:	117.2 pcf
ASH CONTENT, %:	95.7	DRY DENSITY:	83.6 pcf
POROSITY:	46.8		

SIEVE ANALYSIS

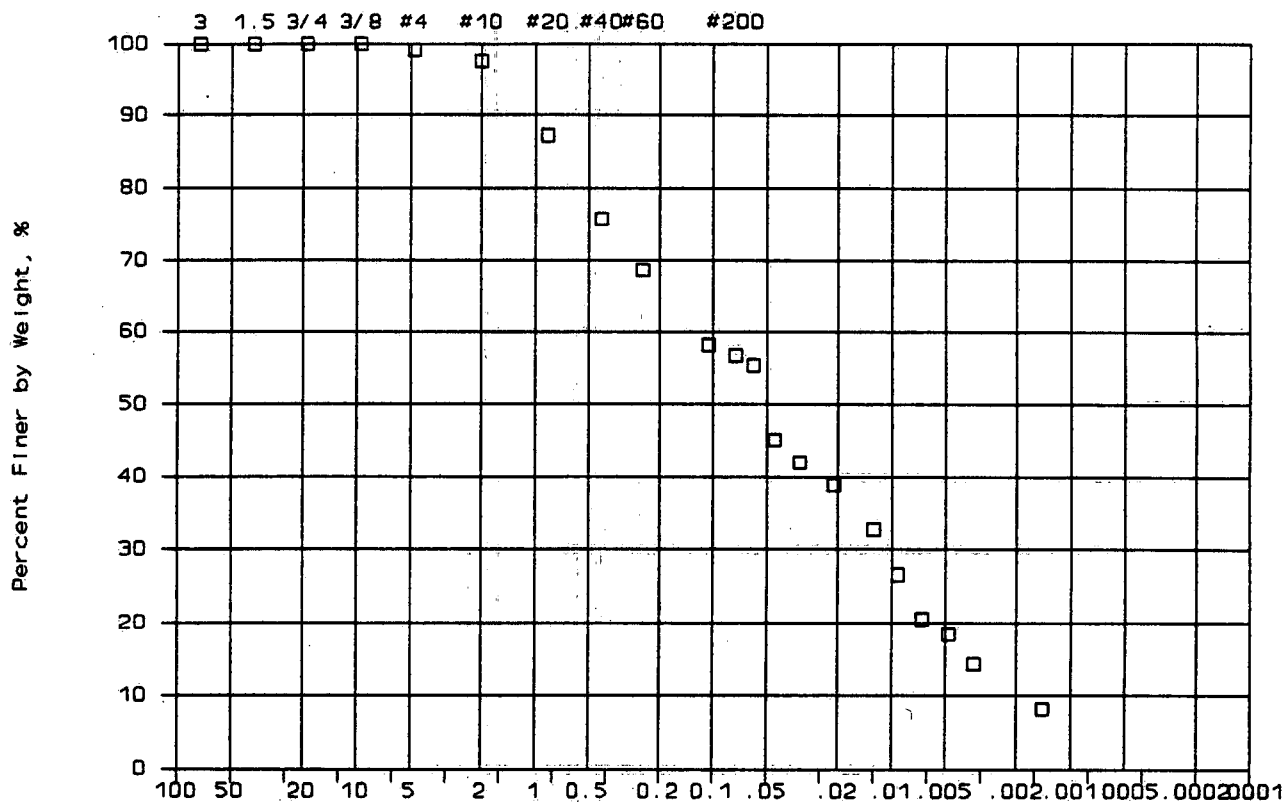
SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	99.2
NO. 10	2.000	97.6
NO. 20	0.850	87.3
NO. 40	0.425	75.7
NO. 60	0.250	68.7
NO. 140	0.106	58.2
NO. 200	0.075	56.7

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0594	55.3
0.0451	45.1
0.0326	42.0
0.0210	38.9
0.0126	32.8
0.0092	26.6
0.0067	20.5
0.0048	18.4
0.0035	14.3
0.0014	8.2

NONPLASTIC

L.E. CARPENTER



□ SAMPLE NO. :

Particle Diameter, mm.
— ST-3B/24-48

— ETDC-1999

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51191

TOTAL ORGANIC CARBON ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
Method Blank	P3763	1 U
ST-2A/24-48	K0494	18,000
ST-2B/72-96	K0495	3,500
ST-2A/48-72	K0496	2,300
ST-2B/24-48	K0497	3,300
ST-2B/48-72	K0498	8,800
ST-3A/0-24	K0499	4,100

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Analysis: 04/22/92

IT Corporation
May 26, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51328

TOTAL ORGANIC CARBON ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Soil

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
Method Blank	P3825	1 U
ST-3B/24-48	K1791	7,000

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date of Analysis: 05/19/92

Appendix E

Soils Analyses

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1

Lab Sample ID: SS8495

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	12,000 U	1,1-dichloroethene	6,200 U
acrylonitrile	12,000 U	trans-1,2-dichloroethene	6,200 U
benzene	6,200 U	1,2-dichloropropane	6,200 U
bromodichloromethane	6,200 U	cis-1,3-dichloropropene	6,200 U
bromoform	6,200 U	trans-1,3-dichloropropene	6,200 U
bromomethane	12,000 U	ethyl benzene	130,000
carbon tetrachloride	6,200 U	methylene chloride	6,200 U
chlorobenzene	6,200 U	1,1,2,2-tetrachloroethane	6,200 U
chloroethane	12,000 U	tetrachloroethene	6,200 U
2-chloroethylvinyl ether	12,000 U	toluene	6,200 U
chloroform	6,200 U	1,1,1-trichloroethane	6,200 U
chloromethane	12,000 U	1,1,2-trichloroethane	6,200 U
dibromochloromethane	6,200 U	trichloroethene	6,200 U
1,1-dichloroethane	6,200 U	trichlorofluoromethane	6,200 U
1,2-dichloroethane	6,200 U	vinyl chloride	12,000 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1

Lab Sample ID: SS8495

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
octane, 4-methyl-	11,000
xlenes (total)	570,000 *
nonane, 2,5-dimethyl-	26,000
cyclohexanemethanol	18,000
cyclohexane, propyl-	40,000
benzene, ethylmethyl-	22,000 Y
nonane, 2-methyl-	35,000
1,10-decanediol	6,500

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1RE

Lab Sample ID: SS8495

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	12,000 U	1,1-dichloroethene	6,200 U
acrylonitrile	12,000 U	trans-1,2-dichloroethene	6,200 U
benzene	6,200 U	1,2-dichloropropane	6,200 U
bromodichloromethane	6,200 U	cis-1,3-dichloropropene	6,200 U
bromoform	6,200 U	trans-1,3-dichloropropene	6,200 U
bromomethane	12,000 U	ethyl benzene	140,000
carbon tetrachloride	6,200 U	methylene chloride	6,200 U
chlorobenzene	6,200 U	1,1,2,2-tetrachloroethane	6,200 U
chloroethane	12,000 U	tetrachloroethene	6,200 U
2-chloroethylvinyl ether	12,000 U	toluene	6,200 U
chloroform	6,200 U	1,1,1-trichloroethane	6,200 U
chloromethane	12,000 U	1,1,2-trichloroethane	6,200 U
dibromochloromethane	6,200 U	trichloroethene	6,200 U
1,1-dichloroethane	6,200 U	trichlorofluoromethane	6,200 U
1,2-dichloroethane	6,200 U	vinyl chloride	12,000 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1RE
Lab Sample ID: SS8495

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
octane, 4-methyl-	12,000
xylene (total)	580,000 *
nonane, 2,5-dimethyl-	30,000
undecanal	20,000
cyclohexane, propyl-	44,000
benzene, ethylmethyl-	24,000 Y
nonane, 2-methyl-	42,000
benzene, 1,3,5-trimethyl-	12,000

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- * - Quantitation based on continuing calibration.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-2

Lab Sample ID: SS8496

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	7 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-2

Lab Sample ID: SS8496

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
acetone	3.7 *
cyclohexane, trimethyl	9.8 Y
xylene	11 *
cyclohexane, ethylmethyl-	35 Y
cyclohexane, 2-propenyl-	15
unknown (substituted cyclohexane)	31
cyclohexane, (1,2-dimethylbutyl)-	53
cyclohexane, 1-ethyl-2,3-dimethyl	40
unknown (substituted cyclohexane)	35
cyclohexane, 1-methyl-2-propyl	28
unknown	21

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- * - Quantitation based on continuing calibration.
Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-3

Lab Sample ID: SS8497

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	4 JB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-3

Lab Sample ID: SS8497

Tentative Identification (1)

Concentration (2)

xylene

2.2 *

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1

Lab Sample ID: VB0331

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,300 U	1,1-dichloroethene	620 U
acrylonitrile	1,300 U	trans-1,2-dichloroethene	620 U
benzene	620 U	1,2-dichloropropane	620 U
bromodichloromethane	620 U	cis-1,3-dichloropropene	620 U
bromoform	620 U	trans-1,3-dichloropropene	620 U
bromomethane	1,300 U	ethyl benzene	620 U
carbon tetrachloride	620 U	methylene chloride	120 J
chlorobenzene	620 U	1,1,2,2-tetrachloroethane	620 U
chloroethane	1,300 U	tetrachloroethene	620 U
2-chloroethylvinyl ether	1,300 U	toluene	620 U
chloroform	620 U	1,1,1-trichloroethane	620 U
chloromethane	1,300 U	1,1,2-trichloroethane	620 U
dibromochloromethane	620 U	trichloroethene	620 U
1,1-dichloroethane	620 U	trichlorofluoromethane	620 U
1,2-dichloroethane	620 U	vinyl chloride	1,300 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/31/92

This method blank applies to the following samples: 1045-052-1 and 1045-052-1 RE.

RE = Reanalyzed

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1
Lab Sample ID: VB0331

Tentative Identification (1)

acetone

Concentration (2)

200

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 2

Lab Sample ID: EB04022

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/02/92

This method blank applies to the following samples: 1045-052-2 and 1045-052-3.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 2
Lab Sample ID: EB04022

Tentative Identification (1)

Concentration (2)

acetonitrile

15

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

SOIL SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	VOLATILE		
	Toluene-D8 (81-117%)*	BFB (74-121%)*	1,2 Dichloroethane-D4 (70-121%)*
1045-052-1	48 **	78	48 **
1045-052-1RE	48 **	75	49 **
Method Blank 1	96	96	94
1045-052-2	117	97	100
1045-052-3	115	92	99
Method Blank 2	98	98	99

*Values in parenthesis represent contract required QC limits.

**Values are outside of contract required QC limits.

RE = Reanalysis

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1

Lab Sample ID: SS8498

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,800 U	bis(2-chloroisopropyl)ether	1,800 U
acenaphthylene	1,800 U	bis(2-ethylhexyl)phthalate	1,900,000 EBD
anthracene	1,800 U	4-bromophenyl phenyl ether	1,800 U
benzidine	9,000 U	2-chloronaphthalene	1,800 U
benzo(a)anthracene	1,800 U	4-chlorophenyl phenyl ether	1,800 U
benzo(b)fluoranthene	1,800 U	chrysene	1,800 U
benzo(k)fluoranthene	1,800 U	dibenz(a,h)anthracene	1,800 U
benzo(a)pyrene	1,800 U	di-n-butylphthalate	11,000
benzo(g,h,i)perylene	1,800 U	1,2-dichlorobenzene	1,800 U
butylbenzylphthalate	1,600 J	1,3-dichlorobenzene	1,800 U
bis(2-chloroethoxy)methane	1,800 U	1,4-dichlorobenzene	1,800 U
bis(2-chloroethyl)ether	1,800 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- J - Indicates an estimated value less than the detection limit.
- B - Analyte was found in the blank as well as the sample.
- E - Compound exceeded calibration range of instrument.
- D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/30/92

Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1
Lab Sample ID: SS8498

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	3,600 U	hexachloroethane	1,800 U
diethylphthalate	1,600 J	indeno(1,2,3-cd)pyrene	1,800 U
dimethyl phthalate	380 J	isophorone	1,800 U
2,4-dinitrotoluene	1,800 U	naphthalene	1,800 U
2,6-dinitrotoluene	1,800 U	nitrobenzene	1,800 U
di-n-octyl phthalate	4,700	n-nitroso-di-n-propylamine	1,800 U
1,2-diphenylhydrazine(1)	1,800 U	n-nitrosodimethylamine	1,800 U
fluoranthene	1,800 U	n-nitrosodiphenylamine(2)	1,800 U
fluorene	1,800 U	phenanthrene	1,800 U
hexachlorobenzene	1,800 U	pyrene	1,800 U
hexachlorobutadiene	1,800 U	1,2,4-trichlorobenzene	1,800 U
hexachlorocyclopentadiene	1,800 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/30/92

Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-1

Lab Sample ID: SS8498

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	14,000 AB
unknown (C ₁₀ alkane)	8,600
unknown (alkane)	7,300
unknown (alkane)	30,000
unknown (alkane)	8,700
unknown (alkane)	6,100
unknown (alkane)	6,900
unknown (alkane)	5,800
unknown (alkane)	11,000
propanoic acid, 2-methyl-, 1-(1,1-dimethylethyl)-2-met	16,000
hexadecanoic acid	6,700
unknown	110,000
octadecanoic acid, 2-methylpropyl ester	9,600
phosphoric acid, 2-ethylhexyl diphenyl ester	55,000
unknown (alkane)	190,000
unknown (phthalate)	12,000
unknown (phthalate)	31,000
unknown (phthalate)	16,000
unknown	5,600
unknown (phthalate)	10,000

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

B - Analyte was found in the blank as well as the sample.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-2
Lab Sample ID: SS8499

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	2,300 U	bis(2-chloroisopropyl)ether	2,300 U
acenaphthylene	2,300 U	bis(2-ethylhexyl)phthalate	650,000 BD
anthracene	2,300 U	4-bromophenyl phenyl ether	2,300 U
benzidine	11,000 U	2-chloronaphthalene	2,300 U
benzo(a)anthracene	2,300 U	4-chlorophenyl phenyl ether	2,300 U
benzo(b)fluoranthene	2,300 U	chrysene	2,300 U
benzo(k)fluoranthene	2,300 U	dibenz(a,h)anthracene	2,300 U
benzo(a)pyrene	2,300 U	di-n-butylphthalate	250 J
benzo(g,h,i)perylene	2,300 U	1,2-dichlorobenzene	2,300 U
butylbenzylphthalate	380 J	1,3-dichlorobenzene	2,300 U
bis(2-chloroethoxy)methane	2,300 U	1,4-dichlorobenzene	2,300 U
bis(2-chloroethyl)ether	2,300 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/30/92
Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-2
Lab Sample ID: SS8499

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	4,500 U	hexachloroethane	2,300 U
diethylphthalate	2,300 U	indeno(1,2,3-cd)pyrene	2,300 U
dimethyl phthalate	2,300 U	isophorone	2,300 U
2,4-dinitrotoluene	2,300 U	naphthalene	2,300 U
2,6-dinitrotoluene	2,300 U	nitrobenzene	2,300 U
di-n-octyl phthalate	1,400 J	n-nitroso-di-n-propylamine	2,300 U
1,2-diphenylhydrazine(1)	2,300 U	n-nitrosodimethylamine	2,300 U
fluoranthene	2,300 U	n-nitrosodiphenylamine(2)	2,300 U
fluorene	2,300 U	phenanthrene	2,300 U
hexachlorobenzene	2,300 U	pyrene	2,300 U
hexachlorobutadiene	2,300 U	1,2,4-trichlorobenzene	2,300 U
hexachlorocyclopentadiene	2,300 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/30/92

Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-2

Lab Sample ID: SS8499

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	14,000 AB
unknown (aldol?)	1,100 A
propanoic acid, 2-methyl-, 1-(1,1-dimethylethyl)-2-met	22,000
hexadecanoic acid	1,000
unknown (amide)	1,200
phosphoric acid, 2-ethylhexyl diphenyl ester	8,400
unknown	4,200
unknown (phthalate)	1,400
unknown (phthalate)	4,000
unknown (phthalate)	3,100
unknown (phthalate)	2,000
unknown (alkane)	1,500
unknown (phthalate)	1,800
unknown (alkane)	1,400
unknown	1,200
unknown	1,200
unknown (phthalate)	3,200
unknown (phthalate)	1,300

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

B - Analyte was found in the blank as well as the sample.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-3

Lab Sample ID: SS8500

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,900 U	bis(2-chloroisopropyl)ether	1,900 U
acenaphthylene	1,900 U	bis(2-ethylhexyl)phthalate	840,000 BD
anthracene	340 J	4-bromophenyl phenyl ether	1,900 U
benzidine	9,400 U	2-chloronaphthalene	1,900 U
benzo(a)anthracene	850 J	4-chlorophenyl phenyl ether	1,900 U
benzo(b)fluoranthene	640 J	chrysene	890 J
benzo(k)fluoranthene	770 J	dibenz(a,h)anthracene	250 J
benzo(a)pyrene	720 J	di-n-butylphthalate	31,000 D
benzo(g,h,i)perylene	1,900 U	1,2-dichlorobenzene	1,900 U
butylbenzylphthalate	1,500 J	1,3-dichlorobenzene	1,900 U
bis(2-chloroethoxy)methane	1,900 U	1,4-dichlorobenzene	1,900 U
bis(2-chloroethyl)ether	1,900 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- J - Indicates an estimated value less than the detection limit.
- B - Analyte was found in the blank as well as the sample.
- D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 03/30/92

Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-3
Lab Sample ID: SS8500

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	3,800 U	hexachloroethane	1,900 U
diethylphthalate	3,700	indeno(1,2,3-cd)pyrene	380 J
dimethyl phthalate	760 J	isophorone	1,900 U
2,4-dinitrotoluene	1,900 U	naphthalene	230 J
2,6-dinitrotoluene	1,900 U	nitrobenzene	1,900 U
di-n-octyl phthalate	3,000	n-nitroso-di-n-propylamine	1,900 U
1,2-diphenylhydrazine(1)	1,900 U	n-nitrosodimethylamine	1,900 U
fluoranthene	1,500 J	n-nitrosodiphenylamine(2)	1,900 U
fluorene	1,900 U	phenanthrene	1,000 J
hexachlorobenzene	1,900 U	pyrene	1,200 J
hexachlorobutadiene	1,900 U	1,2,4-trichlorobenzene	1,900 U
hexachlorocyclopentadiene	1,900 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/30/92

Date of Analysis: 04/13/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: 1045-052-3

Lab Sample ID: SS8500

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	14,000 AB
unknown (alkane)	3,800
unknown	3,700
propanoic acid, 2-methyl-, 1-(1,1-dimethylethyl)-2-met	5,700
hexadecanoic acid	5,700
unknown	100,000
octadecanoic acid, 2-methylpropyl ester	9,000
phosphoric acid, 2-ethylhexyl diphenyl ester	56,000
unknown (phthalate)	4,700
unknown (alkane)	220,000
unknown (phthalate)	19,000
unknown (phthalate)	39,000
unknown (phthalate)	4,600
unknown (phthalate)	22,000
unknown (phthalate)	33,000
unknown (phthalate)	3,900
unknown	3,600
unknown (phthalate)	6,300
unknown (alkane)	10,000
unknown (phthalate)	4,500

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

B - Analyte was found in the blank as well as the sample.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1

Lab Sample ID: BL0163

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	330 U	bis(2-chloroisopropyl)ether	330 U
acenaphthylene	330 U	bis(2-ethylhexyl)phthalate	36 J
anthracene	330 U	4-bromophenyl phenyl ether	330 U
benzidine	1,700 U	2-chloronaphthalene	330 U
benzo(a)anthracene	330 U	4-chlorophenyl phenyl ether	330 U
benzo(b)fluoranthene	330 U	chrysene	330 U
benzo(k)fluoranthene	330 U	dibenz(a,h)anthracene	330 U
benzo(a)pyrene	330 U	di-n-butylphthalate	330 U
benzo(g,h,i)perylene	330 U	1,2-dichlorobenzene	330 U
butylbenzylphthalate	330 U	1,3-dichlorobenzene	330 U
bis(2-chloroethoxy)methane	330 U	1,4-dichlorobenzene	330 U
bis(2-chloroethyl)ether	330 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/30/92

Date of Analysis: 04/10/92

This method blank applies to the following samples: 1045-052-1, 1045-052-1 DL, 1045-052-2, 1045-052-2 DL, 1045-052-3, 1045-052-3 DL and 1045-052-3 DL2.

DL = Dilution

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1
Lab Sample ID: BL0163

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	660 U	hexachloroethane	330 U
diethylphthalate	330 U	indeno(1,2,3-cd)pyrene	330 U
dimethyl phthalate	330 U	isophorone	330 U
2,4-dinitrotoluene	330 U	naphthalene	330 U
2,6-dinitrotoluene	330 U	nitrobenzene	330 U
di-n-octyl phthalate	330 U	n-nitroso-di-n-propylamine	330 U
1,2-diphenylhydrazine(1)	330 U	n-nitrosodimethylamine	330 U
fluoranthene	330 U	n-nitrosodiphenylamine(2)	330 U
fluorene	330 U	phenanthrene	330 U
hexachlorobenzene	330 U	pyrene	330 U
hexachlorobutadiene	330 U	1,2,4-trichlorobenzene	330 U
hexachlorocyclopentadiene	330 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/30/92

Date of Analysis: 04/10/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1

Lab Sample ID: BL0163

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
3-penten-2-one, 4-methyl-	160 A
unknown (aldol?)	390 A
2-pentanone, 4-hydroxy-4-methyl-	6,900 A
unknown	550
5-hexen-2-one, 5-methyl-	280 A
unknown (halogenated benzene)	230
unknown (amide)	3,200

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

SOIL SURROGATE PERCENT RECOVERY SUMMARY

SEMIVOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (23-120%)*</u>	<u>2-Fluoro- Biphenyl (30-115%)*</u>	<u>Terphenyl- D14 (18-137%)*</u>	<u>Phenol-D5 (24-113%)*</u>	<u>2-Fluoro- Phenol (25-121%)*</u>	<u>2,4,6- Tribromo- Phenol (19-122%)*</u>
1045-052-1	86	84	82	74	82	86
1045-052-1 DL	D	D	D	D	D	D
1045-052-2	80	76	71	70	77	77
1045-052-2 DL	D	D	D	D	D	D
1045-052-3	100	86	82	80	92	85
1045-052-3 DL	63	62	56	58	61	55
1045-052-3 DL2	D	D	D	D	D	D
Method Blank 1	88	88	92	78	73	72

*Values in parenthesis represent contract required QC limits.

D - Surrogates diluted out

DL - Dilution

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01

Lab Sample ID: K3220

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,400 U	1,1-dichloroethene	700 U
acrylonitrile	1,400 U	cis-1,2-dichloroethene	700 U
benzene	700 U	trans-1,2-dichloroethene	700 U
bromodichloromethane	700 U	1,2-dichloropropane	700 U
bromoform	700 U	cis-1,3-dichloropropene	700 U
bromomethane	1,400 U	trans-1,3-dichloropropene	700 U
carbon tetrachloride	700 U	ethyl benzene	29,000 D
chlorobenzene	700 U	methylene chloride	820 B
chloroethane	1,400 U	1,1,2,2-tetrachloroethane	700 U
2-chloroethylvinyl ether	1,400 U	tetrachloroethene	700 U
chloroform	700 U	toluene	700 U
chloromethane	1,400 U	1,1,1-trichloroethane	700 U
dibromochloromethane	700 U	1,1,2-trichloroethane	700 U
1,1-dichloroethane	700 U	trichloroethene	700 U
1,2-dichloroethane	700 U	trichlorofluoromethane	700 U
		vinyl chloride	1,400 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01
Lab Sample ID: K3220

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	110,000 Y
unknown hydrocarbon (cyclic?)	30,000
unknown cyclic alkane (C10)	18,000
unknown alkane (C10)	15,000
unknown alkane (C10)	36,000
unknown alkane (C10)	18,000
unknown alkane (cyclic?)	21,000
unknown hydrocarbon	28,000
unknown	17,000
unknown alkane (C11)	17,000

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02

Lab Sample ID: K3221

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	14 U	1,1-dichloroethene	7 U
acrylonitrile	14 U	cis-1,2-dichloroethene	7 U
benzene	7 U	trans-1,2-dichloroethene	7 U
bromodichloromethane	7 U	1,2-dichloropropane	7 U
bromoform	7 U	cis-1,3-dichloropropene	7 U
bromomethane	14 U	trans-1,3-dichloropropene	7 U
carbon tetrachloride	7 U	ethyl benzene	7 U
chlorobenzene	7 U	methylene chloride	430 BD
chloroethane	14 U	1,1,2,2-tetrachloroethane	7 U
2-chloroethylvinyl ether	14 U	tetrachloroethene	7 U
chloroform	7 U	toluene	7 U
chloromethane	14 U	1,1,1-trichloroethane	7 U
dibromochloromethane	7 U	1,1,2-trichloroethane	7 U
1,1-dichloroethane	7 U	trichloroethene	7 U
1,2-dichloroethane	7 U	trichlorofluoromethane	7 U
		vinyl chloride	14 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/10/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02
Lab Sample ID: K3221

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
cyclohexane, butyl-	7.4
cyclohexane, ethyl-methyl-	15 Y
cyclohexane, ethyl-methyl-	22 Y
unknown cyclic	16
unknown cyclic	28
cyclohexane, diethyl-	14
cyclohexane, 1-ethyl-2,3-dim	24
unknown	23
cyclohexane, 1-methyl-2-prop	17

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03

Lab Sample ID: K3222

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	14 U	1,1-dichloroethene	7 U
acrylonitrile	14 U	cis-1,2-dichloroethene	7 U
benzene	7 U	trans-1,2-dichloroethene	7 U
bromodichloromethane	7 U	1,2-dichloropropane	7 U
bromoform	7 U	cis-1,3-dichloropropene	7 U
bromomethane	14 U	trans-1,3-dichloropropene	7 U
carbon tetrachloride	7 U	ethyl benzene	7 U
chlorobenzene	7 U	methylene chloride	79 B
chloroethane	14 U	1,1,2,2-tetrachloroethane	7 U
2-chloroethylvinyl ether	14 U	tetrachloroethene	7 U
chloroform	7 U	toluene	7 U
chloromethane	14 U	1,1,1-trichloroethane	7 U
dibromochloromethane	7 U	1,1,2-trichloroethane	7 U
1,1-dichloroethane	7 U	trichloroethene	7 U
1,2-dichloroethane	7 U	trichlorofluoromethane	7 U
		vinyl chloride	14 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/10/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03

Lab Sample ID: K3222

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
acetone	8.7
cyclohexane, ethyl-methyl-	14 Y
cyclohexane, ethyl-methyl-	16 Y
unknown	14
cyclohexane, undecyl-	36
cyclohexane, diethyl-	12
cyclohexane, 1-ethyl-2,3-dim	23
unknown	13
cyclohexane, 1-methyl-2-prop	14

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04

Lab Sample ID: K3223

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	13 U	1,1-dichloroethene	6 U
acrylonitrile	13 U	cis-1,2-dichloroethene	6 U
benzene	3 J	trans-1,2-dichloroethene	6 U
bromodichloromethane	6 U	1,2-dichloropropane	6 U
bromoform	6 U	cis-1,3-dichloropropene	6 U
bromomethane	13 U	trans-1,3-dichloropropene	6 U
carbon tetrachloride	6 U	ethyl benzene	9
chlorobenzene	6 U	methylene chloride	38 B
chloroethane	13 U	1,1,2,2-tetrachloroethane	6 U
2-chloroethylvinyl ether	13 U	tetrachloroethene	6 U
chloroform	6 U	toluene	3 J
chloromethane	13 U	1,1,1-trichloroethane	6 U
dibromochloromethane	6 U	1,1,2-trichloroethane	6 U
1,1-dichloroethane	6 U	trichloroethene	6 U
1,2-dichloroethane	6 U	trichlorofluoromethane	6 U
		vinyl chloride	13 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/10/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04

Lab Sample ID: K3223

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
acetone	11
benzene, dimethyl	130 Y
benzene, 1,2-dimethyl	12

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1

Lab Sample ID: WB06093

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,200 U	1,1-dichloroethene	620 U
acrylonitrile	1,200 U	cis-1,2-dichloroethene	620 U
benzene	620 U	trans-1,2-dichloroethene	620 U
bromodichloromethane	620 U	1,2-dichloropropane	620 U
bromoform	620 U	cis-1,3-dichloropropene	620 U
bromomethane	1,200 U	trans-1,3-dichloropropene	620 U
carbon tetrachloride	620 U	ethyl benzene	620 U
chlorobenzene	620 U	methylene chloride	360 J
chloroethane	1,200 U	1,1,2,2-tetrachloroethane	620 U
2-chloroethylvinyl ether	1,200 U	tetrachloroethene	620 U
chloroform	620 U	toluene	620 U
chloromethane	1,200 U	1,1,1-trichloroethane	620 U
dibromochloromethane	620 U	1,1,2-trichloroethane	620 U
1,1-dichloroethane	620 U	trichloroethene	620 U
1,2-dichloroethane	620 U	trichlorofluoromethane	620 U
		vinyl chloride	1,200 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/09/92

This method blank applies to the following samples: 1045-067-01 and 1045-067-01 DL.

DL - Dilution.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 1
Lab Sample ID: WB06093

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 2

Lab Sample ID: VB0610

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/10/92

This method blank applies to the following samples: 1045-067-02, 1045-067-02 DL, 1045-067-03 and 1045-067-04.

DL - Dilution.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank 2
Lab Sample ID: VB0610

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

SOIL SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(81-117%)*</u>	<u>BFB</u> <u>(74-121%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(70-121%)*</u>
1045-067-01	97	154 **	99
1045-067-01 DL	102	110	91
Method Blank 1	101	98	94
1045-067-02	106	109	93
1045-067-02 DL	105	108	96
1045-067-03	105	112	97
1045-067-04	105	105	95
Method Blank 2	104	103	101

*Values in parenthesis represent QC limits.

**Values are outside of QC limits.

DL - Dilution

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01

Lab Sample ID: K3228

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	740 U	bis(2-chloroisopropyl)ether	740 U
acenaphthylene	740 U	bis(2-ethylhexyl)phthalate	110,000 D
anthracene	740 U	4-bromophenyl phenyl ether	740 U
benzidine	3,700 U	2-chloronaphthalene	740 U
benzo(a)anthracene	740 U	4-chlorophenyl phenyl ether	740 U
benzo(b)fluoranthene	740 U	chrysene	740 U
benzo(k)fluoranthene	740 U	dibenz(a,h)anthracene	740 U
benzo(a)pyrene	740 U	di-n-butylphthalate	600 J
benzo(g,h,i)perylene	740 U	1,2-dichlorobenzene	740 U
butylbenzylphthalate	1,800 B	1,3-dichlorobenzene	740 U
bis(2-chloroethoxy)methane	740 U	1,4-dichlorobenzene	740 U
bis(2-chloroethyl)ether	740 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- J - Indicates an estimated value less than the detection limit.
- B - Analyte was found in the blank as well as the sample.
- D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01

Lab Sample ID: K3228

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	1,500 U	hexachloroethane	740 U
diethylphthalate	740 U	indeno(1,2,3-cd)pyrene	740 U
dimethyl phthalate	740 U	isophorone	740 U
2,4-dinitrotoluene	740 U	naphthalene	740 U
2,6-dinitrotoluene	740 U	nitrobenzene	740 U
di-n-octyl phthalate	2,500	n-nitroso-di-n-propylamine	740 U
1,2-diphenylhydrazine(1)	740 U	n-nitrosodimethylamine	740 U
fluoranthene	740 U	n-nitrosodiphenylamine(2)	740 U
fluorene	740 U	phenanthrene	740 U
hexachlorobenzene	740 U	pyrene	740 U
hexachlorobutadiene	740 U	1,2,4-trichlorobenzene	740 U
hexachlorocyclopentadiene	740 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01

Lab Sample ID: K3228

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	740 U	2-nitrophenol	740 U
2-chlorophenol	740 U	4-nitrophenol	3,700 U
2,4-dichlorophenol	740 U	pentachlorophenol	3,700 U
2,4-dimethylphenol	740 U	phenol	740 U
2,4-dinitrophenol	3,700 U	2,4,6-trichlorophenol	740 U
2-methyl-4,6-dinitrophenol	3,700 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-01

Lab Sample ID: K3228

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown	12,000
ethanol, 2-(dodecyloxy)-	11,000
cyclopropane, nonyl-	11,000
unknown	34,000
unknown	29,000
1-hexadecanol	9,100
ethanol, 2-(dodecyloxy)-	8,800
unknown	24,000
2-hexadecanol	26,000
unknown	22,000
1-hexadecanol	5,600
hexanedioic acid, dioctyl ester	16,000 B
unknown	25,000
2-pentanone, 4-hydroxy-4-methyl-	25,000 AB
ethanol, 2-(hexadecyloxy)-	4,400
unknown	13,000
1,2-benzenedicarboxylic acid	13,000
1,2-benzenedicarboxylic acid	12,000
unknown	12,000
octane, 2,3-dimethyl-	19,000
propanoic acid, 2-methyl-, 1	3,100
unknown	17,000
1,2-benzenedicarboxylic acid	9,700
octane, 3,6-dimethyl-	16,000

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02

Lab Sample ID: K3229

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,800 U	bis(2-chloroisopropyl)ether	1,800 U
acenaphthylene	1,800 U	bis(2-ethylhexyl)phthalate	20,000
anthracene	1,800 U	4-bromophenyl phenyl ether	1,800 U
benzidine	9,100 U	2-chloronaphthalene	1,800 U
benzo(a)anthracene	1,800 U	4-chlorophenyl phenyl ether	1,800 U
benzo(b)fluoranthene	1,800 U	chrysene	1,800 U
benzo(k)fluoranthene	1,800 U	dibenz(a,h)anthracene	1,800 U
benzo(a)pyrene	1,800 U	di-n-butylphthalate	1,800 U
benzo(g,h,i)perylene	1,800 U	1,2-dichlorobenzene	1,800 U
butylbenzylphthalate	1,800 U	1,3-dichlorobenzene	1,800 U
bis(2-chloroethoxy)methane	1,800 U	1,4-dichlorobenzene	1,800 U
bis(2-chloroethyl)ether	1,800 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02

Lab Sample ID: K3229

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	3,600 U	hexachloroethane	1,800 U
diethylphthalate	1,800 U	indeno(1,2,3-cd)pyrene	1,800 U
dimethyl phthalate	1,800 U	isophorone	1,800 U
2,4-dinitrotoluene	1,800 U	naphthalene	1,800 U
2,6-dinitrotoluene	1,800 U	nitrobenzene	1,800 U
di-n-octyl phthalate	310 J	n-nitroso-di-n-propylamine	1,800 U
1,2-diphenylhydrazine(1)	1,800 U	n-nitrosodimethylamine	1,800 U
fluoranthene	1,800 U	n-nitrosodiphenylamine(2)	1,800 U
fluorene	1,800 U	phenanthrene	1,800 U
hexachlorobenzene	1,800 U	pyrene	1,800 U
hexachlorobutadiene	1,800 U	1,2,4-trichlorobenzene	1,800 U
hexachlorocyclopentadiene	1,800 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02

Lab Sample ID: K3229

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	1,800 U	2-nitrophenol	1,800 U
2-chlorophenol	1,800 U	4-nitrophenol	9,100 U
2,4-dichlorophenol	1,800 U	pentachlorophenol	9,100 U
2,4-dimethylphenol	1,800 U	phenol	1,800 U
2,4-dinitrophenol	9,100 U	2,4,6-trichlorophenol	1,800 U
2-methyl-4,6-dinitrophenol	9,100 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-02

Lab Sample ID: K3229

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
hexanedioic acid, dioctyl ester	16,000 B
unknown	16,000
2-pentanone, 4-hydroxy-4-methyl-	17,000 AB
1,2-benzenedicarboxylic acid-	870
2H-pyran-2,3-diol, tetrahydr	1,500
2-pentanone,5-(acetyloxy)-	1,200 AB

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

B - Analyte was found in the blank as well as the sample.

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03
Lab Sample ID: K3230

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	900 U	bis(2-chloroisopropyl)ether	900 U
acenaphthylene	900 U	bis(2-ethylhexyl)phthalate	11,000
anthracene	900 U	4-bromophenyl phenyl ether	900 U
benzidine	4,500 U	2-chloronaphthalene	900 U
benzo(a)anthracene	900 U	4-chlorophenyl phenyl ether	900 U
benzo(b)fluoranthene	900 U	chrysene	900 U
benzo(k)fluoranthene	900 U	dibenz(a,h)anthracene	900 U
benzo(a)pyrene	120 J	di-n-butylphthalate	900 U
benzo(g,h,i)perylene	900 U	1,2-dichlorobenzene	900 U
butylbenzylphthalate	900 U	1,3-dichlorobenzene	900 U
bis(2-chloroethoxy)methane	900 U	1,4-dichlorobenzene	900 U
bis(2-chloroethyl)ether	900 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03

Lab Sample ID: K3230

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	1,800 U	hexachloroethane	900 U
diethylphthalate	900 U	indeno(1,2,3-cd)pyrene	900 U
dimethyl phthalate	900 U	isophorone	900 U
2,4-dinitrotoluene	900 U	naphthalene	900 U
2,6-dinitrotoluene	900 U	nitrobenzene	900 U
di-n-octyl phthalate	440 J	n-nitroso-di-n-propylamine	900 U
1,2-diphenylhydrazine(1)	900 U	n-nitrosodimethylamine	900 U
fluoranthene	900 U	n-nitrosodiphenylamine(2)	900 U
fluorene	900 U	phenanthrene	900 U
hexachlorobenzene	900 U	pyrene	900 U
hexachlorobutadiene	900 U	1,2,4-trichlorobenzene	900 U
hexachlorocyclopentadiene	900 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03
Lab Sample ID: K3230

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	900 U	2-nitrophenol	900 U
2-chlorophenol	900 U	4-nitrophenol	4,500 U
2,4-dichlorophenol	900 U	pentachlorophenol	4,500 U
2,4-dimethylphenol	900 U	phenol	900 U
2,4-dinitrophenol	4,500 U	2,4,6-trichlorophenol	900 U
2-methyl-4,6-dinitrophenol	4,500 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-03

Lab Sample ID: K3230

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
hexanedioic acid, dioctyl ester	8,100 B
unknown	7,900
2-pentanone, 4-hydroxy-4-methyl	12,000 AB
2-pentanone, 5-(acetyloxy)-	1,100 AB
phosphoric acid, 2-ethylhexy	370
2H-pyran-2,3-diol, tetrahydr	850
1,2-benzenedicarboxylic acid	410
undecane, 5-methyl-	480
2-heptanol, acetate	470 B

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
- B - Analyte was found in the blank as well as the sample.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04
Lab Sample ID: K3231

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,700 U	bis(2-chloroisopropyl)ether	1,700 U
acenaphthylene	1,700 U	bis(2-ethylhexyl)phthalate	310,000 D
anthracene	1,700 U	4-bromophenyl phenyl ether	1,700 U
benzidine	8,400 U	2-chloronaphthalene	1,700 U
benzo(a)anthracene	1,700 U	4-chlorophenyl phenyl ether	1,700 U
benzo(b)fluoranthene	1,700 U	chrysene	1,700 U
benzo(k)fluoranthene	1,700 U	dibenz(a,h)anthracene	1,700 U
benzo(a)pyrene	1,700 U	di-n-butylphthalate	1,700 U
benzo(g,h,i)perylene	1,700 U	1,2-dichlorobenzene	1,700 U
butylbenzylphthalate	600 J	1,3-dichlorobenzene	1,700 U
bis(2-chloroethoxy)methane	1,700 U	1,4-dichlorobenzene	1,700 U
bis(2-chloroethyl)ether	1,700 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04

Lab Sample ID: K3231

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	3,400 U	hexachloroethane	1,700 U
diethylphthalate	1,700 U	indeno(1,2,3-cd)pyrene	1,700 U
dimethyl phthalate	1,700 U	isophorone	1,700 U
2,4-dinitrotoluene	1,700 U	naphthalene	1,700 U
2,6-dinitrotoluene	1,700 U	nitrobenzene	1,700 U
di-n-octyl phthalate	1,100 J	n-nitroso-di-n-propylamine	1,700 U
1,2-diphenylhydrazine(1)	1,700 U	n-nitrosodimethylamine	1,700 U
fluoranthene	1,700 U	n-nitrosodiphenylamine(2)	1,700 U
fluorene	1,700 U	phenanthrene	1,700 U
hexachlorobenzene	1,700 U	pyrene	1,700 U
hexachlorobutadiene	1,700 U	1,2,4-trichlorobenzene	1,700 U
hexachlorocyclopentadiene	1,700 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04
Lab Sample ID: K3231

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	1,700 U	2-nitrophenol	1,700 U
2-chlorophenol	1,700 U	4-nitrophenol	8,400 U
2,4-dichlorophenol	1,700 U	pentachlorophenol	8,400 U
2,4-dimethylphenol	1,700 U	phenol	1,700 U
2,4-dinitrophenol	8,400 U	2,4,6-trichlorophenol	1,700 U
2-methyl-4,6-dinitrophenol	8,400 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb) dry weight

Sample Matrix: Soil

Client Sample ID: 1045-067-04

Lab Sample ID: K3231

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
hexadecanoic	14,000
cyclooctane, -dimethyl-	14,000 Y
propanoic acid, 2-methyl-, 1	13,000
hexanedioic acid, dioctyl ester	14,000 B
2-pentanone, 4-hydroxy-4-methyl-	15,000 AB
tetradecanoic acid	6,500
1,2-benzenedicarboxylic acid	8,600
phosphoric acid, 2-ethylhexy	7,400
1,2-benzenedicarboxylic acid	5,400
unknown	4,000
dodecanamide, N,N-bis(2-hydr	2,100
1,2-benzenedicarboxylic acid	3,100
14-pentadecenoic acid	1,500
unknown	2,500
1,2-benzenedicarboxylic acid	1,700
unknown	2,000
unknown	1,600
1,2-benzenedicarboxylic acid	1,500
propanoic acid, 2-methyl-, 2	810
2H-pyran-2,3-diol, tetrahydr	1,600
benzene, ethyl methyl	1,600 Y
benzene, methyl(-methylethyl)	1,300 Y
benzene, trimethyl-	1,200 Y
heptane, 2,4-dimethyl-	1,100

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.
Y - Indistinguishable isomer in tentatively identified compounds.

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank
Lab Sample ID: H0675

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	330 U	bis(2-chloroisopropyl)ether	330 U
acenaphthylene	330 U	bis(2-ethylhexyl)phthalate	330 U
anthracene	330 U	4-bromophenyl phenyl ether	330 U
benzidine	1,700 U	2-chloronaphthalene	330 U
benzo(a)anthracene	330 U	4-chlorophenyl phenyl ether	330 U
benzo(b)fluoranthene	330 U	chrysene	330 U
benzo(k)fluoranthene	330 U	dibenz(a,h)anthracene	330 U
benzo(a)pyrene	330 U	di-n-butylphthalate	330 U
benzo(g,h,i)perylene	330 U	1,2-dichlorobenzene	330 U
butylbenzylphthalate	48 J	1,3-dichlorobenzene	330 U
bis(2-chloroethoxy)methane	330 U	1,4-dichlorobenzene	330 U
bis(2-chloroethyl)ether	330 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank

Lab Sample ID: H0675

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	660 U	hexachloroethane	330 U
diethylphthalate	330 U	indeno(1,2,3-cd)pyrene	330 U
dimethyl phthalate	330 U	isophorone	330 U
2,4-dinitrotoluene	330 U	naphthalene	330 U
2,6-dinitrotoluene	330 U	nitrobenzene	330 U
di-n-octyl phthalate	330 U	n-nitroso-di-n-propylamine	330 U
1,2-diphenylhydrazine(1)	330 U	n-nitrosodimethylamine	330 U
fluoranthene	330 U	n-nitrosodiphenylamine(2)	330 U
fluorene	330 U	phenanthrene	330 U
hexachlorobenzene	330 U	pyrene	330 U
hexachlorobutadiene	330 U	1,2,4-trichlorobenzene	330 U
hexachlorocyclopentadiene	330 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank
Lab Sample ID: H0675

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	330 U	2-nitrophenol	330 U
2-chlorophenol	330 U	4-nitrophenol	1,700 U
2,4-dichlorophenol	330 U	pentachlorophenol	1,700 U
2,4-dimethylphenol	330 U	phenol	330 U
2,4-dinitrophenol	1,700 U	2,4,6-trichlorophenol	330 U
2-methyl-4,6-dinitrophenol	1,700 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/kg}$ (ppb)

Sample Matrix: Soil

Client Sample ID: Method Blank
Lab Sample ID: H0675

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
hexanedioic acid, dioctyl ester	3,800
2-pentanone, 4-hydroxy-4-methyl-	6,500 A
2-pentanone, 5-(acetyloxy)-	640 A
2-heptanol, acetate	250
cyclobutene, 2-propenylidene-	230

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

SOIL SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (23-120%)*</u>	<u>2-Fluoro- Biphenyl (30-115%)*</u>	<u>Terphenyl- D14 (18-137%)*</u>	<u>Phenol-D5 (24-113%)*</u>	<u>2-Fluoro- Phenol (25-121%)*</u>	<u>2,4,6- Tribromo- Phenol (19-122%)*</u>
1045-067-01	88	85	193 **	98	87	40
1045-067-01 DL	80	80	124	78	64	40
1045-067-02	90	88	105	100	85	63
1045-067-03	88	83	96	95	75	56
1045-067-04	95	88	125	108	91	73
1045-067-04 DL	D	D	D	68	66	D
Method Blank	70	72	79	71	62	62

*Values in parenthesis represent QC limits.

**Values outside of QC limits.

D - Surrogates diluted out

DL - Dilution.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

TOTAL ORGANIC CARBON ANALYSIS

Results in mg/kg (ppm) dry weight

Sample Matrix: Soil

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
Method Blank	P3900	1 U
1045-067-01	K3228	4,000
1045-067-02	K3229	11,000
1045-067-03	K3230	7,400
1045-067-04	K3231	11,000

Date of Analysis: 06/10/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Appendix F

Leachate Analyses

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-1

Lab Sample ID: SS8501

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	100 U	1,1-dichloroethene	50 U
acrylonitrile	100 U	trans-1,2-dichloroethene	50 U
benzene	110	1,2-dichloropropane	50 U
bromodichloromethane	50 U	cis-1,3-dichloropropene	50 U
bromoform	50 U	trans-1,3-dichloropropene	50 U
bromomethane	100 U	ethyl benzene	1,700
carbon tetrachloride	50 U	methylene chloride	800
chlorobenzene	50 U	1,1,2,2-tetrachloroethane	50 U
chloroethane	100 U	tetrachloroethene	50 U
2-chloroethylvinyl ether	100 U	toluene	320
chloroform	30 J	1,1,1-trichloroethane	50 U
chloromethane	100 U	1,1,2-trichloroethane	50 U
dibromochloromethane	50 U	trichloroethene	50 U
1,1-dichloroethane	50 U	trichlorofluoromethane	50 U
1,2-dichloroethane	50 U	vinyl chloride	100 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-1

Lab Sample ID: SS8501

Tentative Identification (1)

Concentration (2)

xylene (total)

7,500 *

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-2

Lab Sample ID: SS8502

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	120	1,2-dichloropropane	5 U
bromodichloromethane	2 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	71
carbon tetrachloride	5 U	methylene chloride	320 DB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	310 D
chloroform	17	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-2

Lab Sample ID: SS8502

Tentative Identification (1)

Concentration (2)

carbon disulfide

55 *

acetone

10 *

xylenes (total)

840 *

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-3

Lab Sample ID: SS8503

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	48	1,2-dichloropropane	5 U
bromodichloromethane	2 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	4 J
carbon tetrachloride	5 U	methylene chloride	6,600 DB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	100
chloroform	18	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-3

Lab Sample ID: SS8503

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
acetone	13 *
carbon disulfide	66 *
xylene (total)	410 *
2-propenoic acid, 2-methyl-, methylester	12

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-4

Lab Sample ID: SS8504

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	10	1,2-dichloropropane	5 U
bromodichloromethane	1 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	110 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	2 J
chloroform	13	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-4

Lab Sample ID: SS8504

Tentative Identification (1)

Concentration (2)

acetone	3.7 *
carbon disulfide	9.0 *
xylenes (total)	64 *

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-5

Lab Sample ID: SS8505

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	8	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	67	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/02/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-5

Lab Sample ID: SS8505

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB03313

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 03/31/92

This method blank applies to the following sample: 1045-055-1.

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May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB03313

Tentative Identification (1)

Concentration (2)

xylenes (total)

1.0 *

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

* - Quantitation based on continuing calibration.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: EB0402

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/02/92

This method blank applies to the following samples: 1045-055-1 DL, 1045-055-2, 1045-055-2 DL, 1045-055-3, 1045-055-3 DL, 1045-055-4 and 1045-055-5.

DL - Dilution

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: EB0402

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

WATER SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(88-110%)*</u>	<u>BFB</u> <u>(86-115%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(76-114%)*</u>
1045-055-1	96	106	97
Method Blank 1	100	101	97
1045-055-1 DL	97	96	89
1045-055-2	89	96	86
1045-055-2 DL	100	100	93
1045-055-3	101	101	92
1045-055-3 DL	97	94	86
1045-055-4	98	93	83
1045-055-5	100	97	86
Method Blank 2	101	98	94

*Values in parenthesis represent required QC limits.

DL - Dilution

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-1

Lab Sample ID: SS8506

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	20
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-1
Lab Sample ID: SS8506

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	86	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	26	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	3 J
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-1

Lab Sample ID: SS8506

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, (1-methylethyl)-	30
ethanol, 2-[(phenylmethyl)amino]-	11
ethyl methyl benzene	43 Y
trimethyl benzene	21 Y
trimethyl benzene	49 Y
trimethyl benzene	19 Y
1,2-benzisothiazole	17
unknown	8.8
1,3,2-dioxaphosphorinane, 5,5-dimethyl-2-phenoxy-,2-o	27

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-2

Lab Sample ID: SS8507

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

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May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-2
Lab Sample ID: SS8507

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	11	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-2

Lab Sample ID: SS8507

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	13 AB
3-undecene, 6-methyl-, (E)-	20
1,2-benzisothiazole	15
cyclohexane, isothiocyanato-	11

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- B - Analyte was found in the blank as well as the sample.
A - Suspected aldol condensation product.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-3

Lab Sample ID: SS8508

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-3

Lab Sample ID: SS8508

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	12	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-3

Lab Sample ID: SS8508

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
3-undecene, 6-methyl-, (E)-	25
1,2-benzisothiazole	14
cyclohexane, isothiocyanato-	17

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-4

Lab Sample ID: SS8509

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-4
Lab Sample ID: SS8509

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	2 J	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-4

Lab Sample ID: SS8509

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	8.2 AB
3-undecene, 6-methyl-, (E)-	11

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- B - Analyte was found in the blank as well as the sample.
- A - Suspected aldol condensation product.

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May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-5

Lab Sample ID: SS8510

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92

Date of Analysis: 03/31/92

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May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-5
Lab Sample ID: SS8510

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 03/27/92
Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-055-5
Lab Sample ID: SS8510

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BL0143

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	3 J
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 03/27/92
Date of Analysis: 03/31/92

This method blank applies to the following samples: 1045-055-1, 1045-055-2, 1045-055-3, 1045-055-4 and 1045-055-5.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BL0143

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 03/27/92
Date of Analysis: 03/31/92

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BL0143

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	21 A
unknown	60

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1045-055-1	87	93	66	NA	NA	NA
1045-055-2	79	87	64	NA	NA	NA
1045-055-3	80	88	66	NA	NA	NA
1045-055-4	82	86	79	NA	NA	NA
1045-055-5	84	91	84	NA	NA	NA
Method Blank 1	79	86	92	NA	NA	NA

*Values in parenthesis represent contract required QC limits.
NA - Not applicable

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51019

CHEMICAL OXYGEN DEMAND

Results in mg/liter (ppm)

Sample Matrix: Water

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
1045-055-5	SS8511	8.7
Method Blank	-	*

Date of Analysis: 03/31/92

* - A method blank is not applicable for this analysis.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1

Lab Sample ID: K1180

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	32	1,2-dichloropropane	5 U
bromodichloromethane	3 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1,500 DB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	40
chloroform	40	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/27/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1

Lab Sample ID: K1180

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
carbon disulfide	61
2-propenoic acid, 2-methyl-,	25
benzene, dimethyl-	2,400 Y
benzene, dimethyl-	430 Y
benzene, 1-ethyl-methyl-	45 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2

Lab Sample ID: K1181

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	4 J	1,2-dichloropropane	5 U
bromodichloromethane	3 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	570 DB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5
chloroform	27	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/27/92

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May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2

Lab Sample ID: K1181

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
carbon disulfide	1.3
2-propenoic acid, 2-methyl-,	5.0
benzene, dimethyl-	4.2 Y
benzene, dimethyl-	33 Y
benzene, dimethyl-	25 Y

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3

Lab Sample ID: K1182

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	3 J	1,2-dichloropropane	5 U
bromodichloromethane	4 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	8,100 DB
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	3 J
chloroform	39	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
- J - Indicates an estimated value less than the detection limit.
- B - Analyte was found in the blank as well as the sample.
- D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 04/27/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3

Lab Sample ID: K1182

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

88 Y

benzene, dimethyl-

18 Y

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4

Lab Sample ID: K1183

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	3 J	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	64 B
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	43	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 04/27/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4
Lab Sample ID: K1183

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB0427

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	2 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/27/92

This method blank applies to the following samples: 1045-061-1, 1045-061-2, 1045-061-3 and 1045-061-4.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: VB0427

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: VB0428

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	2 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 04/28/92

This method blank applies to the following samples: 1045-061-1 DL, 1045-061-2 DL, and 1045-061-3 DL.

DL - Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: VB0428

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

WATER SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	VOLATILE		
	Toluene-D8 (88-110%)*	BFB (86-115%)*	1,2 Dichloroethane-D4 (76-114%)*
1045-061-1	100	117 **	100
1045-061-1 DL	108	111	103
1045-061-2	99	104	99
1045-061-2 DL	104	104	96
1045-061-3	101	106	99
1045-061-3 DL	102	103	100
1045-061-4	99	104	99
Method Blank 1	108	109	109
Method Blank 2	96	96	91

*Values in parenthesis represent contract required QC limits.

**Values outside of contract required QC limits.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1

Lab Sample ID: K1184

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1
Lab Sample ID: K1184

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	2 J
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1

Lab Sample ID: K1184

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	130	phenol	2 J
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-1
Lab Sample ID: K1184

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, ethyl-methyl-	45 Y
benzene, ethyl-methyl-	24 Y
benzenemethanol, 2-methyl-	17
benzene, trimethyl-	22 Y
benzothiazole	15
benzene, trimethyl-	16 Y
cyclohexane, isothiocyanato-	9.4

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2

Lab Sample ID: K1185

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2
Lab Sample ID: K1185

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2

Lab Sample ID: K1185

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-2

Lab Sample ID: K1185

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3

Lab Sample ID: K1186

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3
Lab Sample ID: K1186

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 04/28/92
Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3
Lab Sample ID: K1186

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92
Date of Analysis: 05/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-3

Lab Sample ID: K1186

Tentative Identification (1)

Concentration (2)

benzothiazole

11

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4

Lab Sample ID: K1187

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4
Lab Sample ID: K1187

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4

Lab Sample ID: K1187

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-061-4
Lab Sample ID: K1187

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0436

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92
Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0436

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: H0436

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 04/28/92

Date of Analysis: 05/05/92

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0436

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	16 A

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

IT Corporation
May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1045-061-1	84	97	96	34	53	68
1045-061-2	86	101	106	27	40	60
1045-061-3	93	92	95	35	56	61
1045-061-4	108	99	90	32	46	59
Method Blank	89	101	113	31	42	58

*Values in parenthesis represent contract required QC limits.

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May 29, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51254

CHEMICAL OXYGEN DEMAND

Results in mg/liter (ppm)

Sample Matrix: Water

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
Method Blank	-	*
1045-061-1	K1188	25
1045-061-2	K1189	6.2
1045-061-3	K1190	15
1045-061-4	K1191	12

Date of Analysis: 04/28/92

* - A method blank is not applicable for this analysis.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1

Lab Sample ID: K1746

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,000 U	1,1-dichloroethene	500 U
acrylonitrile	1,000 U	trans-1,2-dichloroethene	500 U
benzene	500 U	1,2-dichloropropane	500 U
bromodichloromethane	500 U	cis-1,3-dichloropropene	500 U
bromoform	500 U	trans-1,3-dichloropropene	500 U
bromomethane	1,000 U	ethyl benzene	1,800
carbon tetrachloride	500 U	methylene chloride	1,100 B
chlorobenzene	500 U	1,1,2,2-tetrachloroethane	500 U
chloroethane	1,000 U	tetrachloroethene	500 U
2-chloroethylvinyl ether	1,000 U	toluene	500 U
chloroform	500 U	1,1,1-trichloroethane	500 U
chloromethane	1,000 U	1,1,2-trichloroethane	500 U
dibromochloromethane	500 U	trichloroethene	500 U
1,1-dichloroethane	500 U	trichlorofluoromethane	500 U
1,2-dichloroethane	500 U	vinyl chloride	1,000 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 05/08/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1

Lab Sample ID: K1746

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	14,000 Y
nonane	1,500
benzene, 1,2-dimethyl	1,400
octane, dimethyl-	1,200 Y
nonane, 3-methyl-	2,600
cyclohexane, diethyl	1,500
octane, dimethyl-	4,300 Y
nonane, 3-methyl-	2,600
cyclopentane, 1-methyl-3-(2-methylpropyl)-	1,700
decane	4,700

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2

Lab Sample ID: K1747

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	50 U	1,1-dichloroethene	20 U
acrylonitrile	50 U	trans-1,2-dichloroethene	20 U
benzene	7 J	1,2-dichloropropane	20 U
bromodichloromethane	20 U	cis-1,3-dichloropropene	20 U
bromoform	20 U	trans-1,3-dichloropropene	20 U
bromomethane	50 U	ethyl benzene	20 U
carbon tetrachloride	20 U	methylene chloride	620 B
chlorobenzene	20 U	1,1,2,2-tetrachloroethane	20 U
chloroethane	50 U	tetrachloroethene	20 U
2-chloroethylvinyl ether	50 U	toluene	18 J
chloroform	8 J	1,1,1-trichloroethane	20 U
chloromethane	50 U	1,1,2-trichloroethane	20 U
dibromochloromethane	20 U	trichloroethene	20 U
1,1-dichloroethane	20 U	trichlorofluoromethane	20 U
1,2-dichloroethane	20 U	vinyl chloride	50 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 05/07/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2

Lab Sample ID: K1747

Tentative Identification (1)

Concentration (2)

acetone	6.3
benzene, dimethyl-	53 Y
benzene, 1,2-dimethyl-	7.0

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3

Lab Sample ID: K1748

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	250 U	1,1-dichloroethene	120 U
acrylonitrile	250 U	trans-1,2-dichloroethene	120 U
benzene	120 U	1,2-dichloropropane	120 U
bromodichloromethane	120 U	cis-1,3-dichloropropene	120 U
bromoform	120 U	trans-1,3-dichloropropene	120 U
bromomethane	250 U	ethyl benzene	120 U
carbon tetrachloride	120 U	methylene chloride	3,800 B
chlorobenzene	120 U	1,1,2,2-tetrachloroethane	120 U
chloroethane	250 U	tetrachloroethene	120 U
2-chloroethylvinyl ether	250 U	toluene	120 U
chloroform	46 J	1,1,1-trichloroethane	120 U
chloromethane	250 U	1,1,2-trichloroethane	120 U
dibromochloromethane	120 U	trichloroethene	120 U
1,1-dichloroethane	120 U	trichlorofluoromethane	120 U
1,2-dichloroethane	120 U	vinyl chloride	250 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 05/07/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3
Lab Sample ID: K1748

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

42 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4

Lab Sample ID: K1749

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	100 U	1,1-dichloroethene	50 U
acrylonitrile	100 U	trans-1,2-dichloroethene	50 U
benzene	50 U	1,2-dichloropropane	50 U
bromodichloromethane	50 U	cis-1,3-dichloropropene	50 U
bromoform	50 U	trans-1,3-dichloropropene	50 U
bromomethane	100 U	ethyl benzene	50 U
carbon tetrachloride	50 U	methylene chloride	64 B
chlorobenzene	50 U	1,1,2,2-tetrachloroethane	50 U
chloroethane	100 U	tetrachloroethene	50 U
2-chloroethylvinyl ether	100 U	toluene	50 U
chloroform	37 J	1,1,1-trichloroethane	50 U
chloromethane	100 U	1,1,2-trichloroethane	50 U
dibromochloromethane	50 U	trichloroethene	50 U
1,1-dichloroethane	50 U	trichlorofluoromethane	50 U
1,2-dichloroethane	50 U	vinyl chloride	100 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 05/07/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4
Lab Sample ID: K1749

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

15 Y

benzene, 1,2-dimethyl-

12

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: VB0507

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 05/07/92

This method blank applies to the following samples: 1045-063-2, 1045-063-3 and 1045-063-4.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: VB0507

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: EB0508

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 05/08/92

This method blank applies to the following sample: 1045-063-1.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: EB0508

Tentative Identification (1)

Concentration (2)

none detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

WATER SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(88-110%)*</u>	<u>BFB</u> <u>(86-115%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(76-114%)*</u>
1045-063-2	97	93	88
1045-063-3	98	93	91
1045-063-4	96	91	91
Method Blank 1	103	97	97
1045-063-1	100	104	93
Method Blank 2	103	102	97

*Values in parenthesis represent contract required QC limits.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1

Lab Sample ID: K1754

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	500 U	bis(2-chloroisopropyl)ether	500 U
acenaphthylene	500 U	bis(2-ethylhexyl)phthalate	61,000 D
anthracene	500 U	4-bromophenyl phenyl ether	500 U
benzidine	2,500 U	2-chloronaphthalene	500 U
benzo(a)anthracene	500 U	4-chlorophenyl phenyl ether	500 U
benzo(b)fluoranthene	500 U	chrysene	500 U
benzo(k)fluoranthene	500 U	dibenz(a,h)anthracene	500 U
benzo(a)pyrene	500 U	di-n-butylphthalate	500 U
benzo(g,h,i)perylene	500 U	1,2-dichlorobenzene	500 U
butylbenzylphthalate	540	1,3-dichlorobenzene	500 U
bis(2-chloroethoxy)methane	500 U	1,4-dichlorobenzene	500 U
bis(2-chloroethyl)ether	500 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

IT Corporation
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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1

Lab Sample ID: K1754

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	1,000 U	hexachloroethane	500 U
diethylphthalate	500 U	indeno(1,2,3-cd)pyrene	500 U
dimethyl phthalate	500 U	isophorone	500 U
2,4-dinitrotoluene	500 U	naphthalene	500 U
2,6-dinitrotoluene	500 U	nitrobenzene	500 U
di-n-octyl phthalate	190 J	n-nitroso-di-n-propylamine	500 U
1,2-diphenylhydrazine(1)	500 U	n-nitrosodimethylamine	500 U
fluoranthene	500 U	n-nitrosodiphenylamine(2)	500 U
fluorene	500 U	phenanthrene	500 U
hexachlorobenzene	500 U	pyrene	500 U
hexachlorobutadiene	500 U	1,2,4-trichlorobenzene	500 U
hexachlorocyclopentadiene	500 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1

Lab Sample ID: K1754

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	500 U	2-nitrophenol	500 U
2-chlorophenol	500 U	4-nitrophenol	2,500 U
2,4-dichlorophenol	500 U	pentachlorophenol	2,500 U
2,4-dimethylphenol	500 U	phenol	500 U
2,4-dinitrophenol	2,500 U	2,4,6-trichlorophenol	500 U
2-methyl-4,6-dinitrophenol	2,500 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-1
Lab Sample ID: K1754

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown	4,700
unknown	21,000
ethanol, 2-(dodecyloxy)-	21,000
1-dodecanol	13,000
unknown	34,000
ethanol, 2-(dodecyloxy)-	17,000
unknown	3,500
unknown	3,100
unknown	2,000
1-hexadecanol	5,400
unknown	4,500
ethanol, 2-(dodecyloxy)-	4,500
ethanol, 2-(hexadecyloxy)-	3,900
decane	4,000
unknown	6,300
octane, 2,5-dimethyl-	1,700
unknown	3,000
1-nonene, 4,6,8-trimethyl-	1,600
nonane, 3-methyl-	1,400
1-decene, dimethyl-	1,300 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2

Lab Sample ID: K1755R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2
Lab Sample ID: K1755R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2

Lab Sample ID: K1755R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-2
Lab Sample ID: K1755R

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	14 B
benzothiazole	8.4

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

B - Analyte was found in the blank as well as the sample.

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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3

Lab Sample ID: K1756R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3
Lab Sample ID: K1756R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3

Lab Sample ID: K1756R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-3

Lab Sample ID: K1756R

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzothiazole	21
benzothiazole, 2-(methylthio)-	9.4
2-pentanone, 4-hydroxy-4-methyl-	11 AB

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
- B - Analyte was found in the blank as well as the sample.

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KNOXVILLE, TN

Client Project ID: LE Carpenter

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BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4

Lab Sample ID: K1757

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	500 U	bis(2-chloroisopropyl)ether	500 U
acenaphthylene	500 U	bis(2-ethylhexyl)phthalate	490 J
anthracene	500 U	4-bromophenyl phenyl ether	500 U
benzidine	2,500 U	2-chloronaphthalene	500 U
benzo(a)anthracene	500 U	4-chlorophenyl phenyl ether	500 U
benzo(b)fluoranthene	500 U	chrysene	500 U
benzo(k)fluoranthene	500 U	dibenz(a,h)anthracene	500 U
benzo(a)pyrene	500 U	di-n-butylphthalate	500 U
benzo(g,h,i)perylene	500 U	1,2-dichlorobenzene	500 U
butylbenzylphthalate	190 J	1,3-dichlorobenzene	500 U
bis(2-chloroethoxy)methane	500 U	1,4-dichlorobenzene	500 U
bis(2-chloroethyl)ether	500 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4
Lab Sample ID: K1757

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'dichlorobenzidine	1,000 U	hexachloroethane	500 U
diethylphthalate	500 U	indeno(1,2,3-cd)pyrene	500 U
dimethyl phthalate	500 U	isophorone	500 U
2,4-dinitrotoluene	500 U	naphthalene	500 U
2,6-dinitrotoluene	500 U	nitrobenzene	500 U
di-n-octyl phthalate	500 U	n-nitroso-di-n-propylamine	500 U
1,2-diphenylhydrazine(1)	500 U	n-nitrosodimethylamine	500 U
fluoranthene	500 U	n-nitrosodiphenylamine(2)	500 U
fluorene	500 U	phenanthrene	500 U
hexachlorobenzene	500 U	pyrene	500 U
hexachlorobutadiene	500 U	1,2,4-trichlorobenzene	500 U
hexachlorocyclopentadiene	500 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4

Lab Sample ID: K1757

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	500 U	2-nitrophenol	500 U
2-chlorophenol	500 U	4-nitrophenol	2,500 U
2,4-dichlorophenol	500 U	pentachlorophenol	2,500 U
2,4-dimethylphenol	500 U	phenol	500 U
2,4-dinitrophenol	2,500 U	2,4,6-trichlorophenol	500 U
2-methyl-4,6-dinitrophenol	2,500 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-063-4
Lab Sample ID: K1757

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown (organic acid)	9,300
unknown	2,200
9-octadecenoic acid (Z)-	1,300
tetradecanoic acid	1,100
hexadecanoic acid	850
2-pentanone, 4-hydroxy-4-methyl-	1,300 AB
dodecanamide, n,n-bis(2-hydroxyethyl)-	500
9-octadecenoic acid (Z)-,2-hydroxyethyl ester	480

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.

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IT ANALYTICAL SERVICES
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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: H0510R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

This method blank applies to the following samples: 1045-063-2 and 1045-063-3.

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IT ANALYTICAL SERVICES
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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: H0510R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 05/08/92

Date of Analysis: 05/13/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: H0510R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

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KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: H0510R

Tentative Identification (1)
2-pentanone, 4-hydroxy-4-methyl-

Concentration (2)
14 A

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: H0516

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

This method blank applies to the following samples: 1045-063-1, 1045-063-1 DL and 1045-063-4.

DL = Dilution

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: H0516

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: H0516

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/08/92
Date of Analysis: 05/13/92

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: H0516

Tentative Identification (1)
2-pentanone, 4-hydroxy-4-methyl-

Concentration (2)
28 A

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

Client Project ID: LE Carpenter

Job Number: ITAD 51315

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1045-063-1	76	86	160 **	40	57	49
1045-063-1 DL	75	79	93	33	49	69
1045-063-2	83	104	80	31	47	67
1045-063-3	77	102	61	32	46	72
1045-063-4	85	93	78	38	53	54
Method Blank 1	84	85	75	35	52	63
Method Blank 2	89	94	78	36	53	67

*Values in parenthesis represent contract required QC limits.

**Values are outside of contract required QC limits.

DL - Dilution

IT Corporation
May 27, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51315

CHEMICAL OXYGEN DEMAND

Results in mg/liter (ppm)

Sample Matrix: Water

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>
Method Blank	-	*
1045-063-1	K1750	8,700
1045-063-2	K1751	35
1045-063-3	K1752	13
1045-063-4	K1753	9,200

Date of Analysis: 05/06/92

* - A method blank is not applicable for this analysis.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01

Lab Sample ID: K3212

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	50 U	1,1-dichloroethene	25 U
acrylonitrile	50 U	cis-1,2-dichloroethene	25 U
benzene	16 J	trans-1,2-dichloroethene	25 U
bromodichloromethane	25 U	1,2-dichloropropane	25 U
bromoform	25 U	cis-1,3-dichloropropene	25 U
bromomethane	50 U	trans-1,3-dichloropropene	25 U
carbon tetrachloride	25 U	ethyl benzene	260
chlorobenzene	25 U	methylene chloride	1,200 BD
chloroethane	50 U	1,1,2,2-tetrachloroethane	25 U
2-chloroethylvinyl ether	50 U	tetrachloroethene	25 U
chloroform	7 J	toluene	26
chloromethane	50 U	1,1,1-trichloroethane	25 U
dibromochloromethane	25 U	1,1,2-trichloroethane	25 U
1,1-dichloroethane	25 U	trichloroethene	25 U
1,2-dichloroethane	25 U	trichlorofluoromethane	25 U
		vinyl chloride	50 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/05/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01
Lab Sample ID: K3212

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	510 Y
nonane	22
benzene, 1,2-dimethyl	31
unknown (SAT'D HC)	29
nonane, 3-methyl-	26
benzene, ethylmethyl-	20 Y
decane	58
benzene, trimethyl-	22 Y
decane, 4-methyl-	20
undecane	240

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02

Lab Sample ID: K3213R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	33 U	1,1-dichloroethene	17 U
acrylonitrile	33 U	cis-1,2-dichloroethene	17 U
benzene	6 J	trans-1,2-dichloroethene	17 U
bromodichloromethane	17 U	1,2-dichloropropane	17 U
bromoform	17 U	cis-1,3-dichloropropene	17 U
bromomethane	33 U	trans-1,3-dichloropropene	17 U
carbon tetrachloride	17 U	ethyl benzene	17 U
chlorobenzene	17 U	methylene chloride	390 B
chloroethane	33 U	1,1,2,2-tetrachloroethane	17 U
2-chloroethylvinyl ether	33 U	tetrachloroethene	17 U
chloroform	17 U	toluene	16 J
chloromethane	33 U	1,1,1-trichloroethane	17 U
dibromochloromethane	17 U	1,1,2-trichloroethane	17 U
1,1-dichloroethane	17 U	trichloroethene	17 U
1,2-dichloroethane	17 U	trichlorofluoromethane	17 U
		vinyl chloride	33 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/05/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02
Lab Sample ID: K3213R

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

54 Y

benzene, 1,2-dimethyl-

11

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03

Lab Sample ID: K3214R

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	2 J	trans-1,2-dichloroethene	5 U
bromodichloromethane	1 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	3 J
chlorobenzene	5 U	methylene chloride	5,800 BD
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	18	toluene	3 J
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03
Lab Sample ID: K3214R

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

28 Y

benzene, 1,2-dimethyl-

7.6

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04

Lab Sample ID: K3215

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	50 U	1,1-dichloroethene	25 U
acrylonitrile	50 U	cis-1,2-dichloroethene	25 U
benzene	15 J	trans-1,2-dichloroethene	25 U
bromodichloromethane	25 U	1,2-dichloropropane	25 U
bromoform	25 U	cis-1,3-dichloropropene	25 U
bromomethane	50 U	trans-1,3-dichloropropene	25 U
carbon tetrachloride	25 U	ethyl benzene	25 U
chlorobenzene	25 U	methylene chloride	58 B
chloroethane	50 U	1,1,2,2-tetrachloroethane	25 U
2-chloroethylvinyl ether	50 U	tetrachloroethene	25 U
chloroform	9 J	toluene	21 J
chloromethane	50 U	1,1,1-trichloroethane	25 U
dibromochloromethane	25 U	1,1,2-trichloroethane	25 U
1,1-dichloroethane	25 U	trichloroethene	25 U
1,2-dichloroethane	25 U	trichlorofluoromethane	25 U
		vinyl chloride	50 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04
Lab Sample ID: K3215

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
pentane	100
hexane	110
octane	76
benzene, dimethyl-	42 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

CHEMICAL OXYGEN DEMAND ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Result</u>	<u>Analysis Date</u>
Method Blank	*	-	
1045-066-01	K3224	11,000	06/02/92
1045-066-02	K3225	34	06/03/92
1045-066-03	K3226	7.5	06/03/92
1045-066-04	K3227	11,000	06/02/92

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
* - A method blank is not applicable for this analysis.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3216

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	26	trans-1,2-dichloroethene	5 U
bromodichloromethane	3 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	7
chlorobenzene	5 U	methylene chloride	1,300 BD
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	32	toluene	29
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3216

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
carbon disulfide	20
2-propenoic acid, 2-methyl-,	5.3
benzene, dimethyl-	2,700 Y
benzene, 1,2-dimethyl-	560
benzene, ethylmethyl-	40 Y
benzene, trimethyl-	39 Y
benzene, ethylmethyl-	7.2 Y
benzene, trimethyl-	58 Y
benzene, trimethyl-	24 Y
benzene, tetramethyl-	8.1 Y

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02

Lab Sample ID: K3217

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	3 J	trans-1,2-dichloroethene	5 U
bromodichloromethane	2 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	4 J
chlorobenzene	5 U	methylene chloride	410 BD
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	20	toluene	5
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02
Lab Sample ID: K3217

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-

76 Y

benzene, 1,2-dimethyl-

13

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03

Lab Sample ID: K3218

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	3 J	trans-1,2-dichloroethene	5 U
bromodichloromethane	3 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	2 J
chlorobenzene	5 U	methylene chloride	5,600 BD
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	26	toluene	5
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03
Lab Sample ID: K3218

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-	28 Y
benzene, 1,2-dimethyl-	5.5

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04

Lab Sample ID: K3219

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	3 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	1 J
chlorobenzene	5 U	methylene chloride	53 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	28	toluene	2 J
chloromethane	10 U	1,1,1-trichloroethane	1 J
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04

Lab Sample ID: K3219

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB06052

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/05/92

This method blank applies to the following samples: 1045-066-01, 1045-066-01 DL, 1045-066-02.

DL - Dilution.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: WB06052

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: WB06084

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/08/92

This method blank applies to the following samples: 1045-066-03, 1045-066-03 DL, 1045-066-04 and 1045-068-01.

DL - Dilution.

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: WB06084

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: WB0609

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/09/92

This method blank applies to the following samples: 1045-068-01 DL, 1045-068-02, 1045-068-02 DL, 1045-068-03, 1045-068-03 DL, 1045-068-04.

DL - Dilution.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3
Lab Sample ID: WB0609

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Client Project ID: LE Carpenter

Job Number: ITPK 51491

WATER SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	VOLATILE		
	Toluene-D8 (88-110%)*	BFB (86-115%)*	1,2 Dichloroethane-D4 (76-114%)*
1045-066-01	100	107	101
1045-066-01 DL	99	96	96
1045-066-02	96	93	93
1045-066-03	103	95	88
1045-066-03 DL	102	98	95
1045-066-04	106	89	96
1045-068-01	101	121 **	90
1045-068-01 DL	104	109	100
1045-068-02	98	98	92
1045-068-02 DL	100	98	94
1045-068-03	98	99	92
1045-068-03 DL	104	100	97
1045-068-04	96	96	91
Method Blank 1	101	97	98
Method Blank 2	100	96	95
Method Blank 3	108	105	101

*Values in parenthesis represent QC limits.

**Values are outside of QC limits.

DL = Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01

Lab Sample ID: K3232

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,000 U	bis(2-chloroisopropyl)ether	1,000 U
acenaphthylene	1,000 U	bis(2-ethylhexyl)phthalate	3,200
anthracene	1,000 U	4-bromophenyl phenyl ether	1,000 U
benzidine	5,000 U	2-chloronaphthalene	1,000 U
benzo(a)anthracene	1,000 U	4-chlorophenyl phenyl ether	1,000 U
benzo(b)fluoranthene	1,000 U	chrysene	1,000 U
benzo(k)fluoranthene	1,000 U	dibenz(a,h)anthracene	1,000 U
benzo(a)pyrene	1,000 U	di-n-butylphthalate	1,000 U
benzo(g,h,i)perylene	1,000 U	1,2-dichlorobenzene	1,000 U
butylbenzylphthalate	1,000 U	1,3-dichlorobenzene	1,000 U
bis(2-chloroethoxy)methane	1,000 U	1,4-dichlorobenzene	1,000 U
bis(2-chloroethyl)ether	1,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01

Lab Sample ID: K3232

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	2,000 U	hexachloroethane	1,000 U
diethylphthalate	1,000 U	indeno(1,2,3-cd)pyrene	1,000 U
dimethyl phthalate	1,000 U	isophorone	1,000 U
2,4-dinitrotoluene	1,000 U	naphthalene	1,000 U
2,6-dinitrotoluene	1,000 U	nitrobenzene	1,000 U
di-n-octyl phthalate	1,000 U	n-nitroso-di-n-propylamine	1,000 U
1,2-diphenylhydrazine(1)	1,000 U	n-nitrosodimethylamine	1,000 U
fluoranthene	1,000 U	n-nitrosodiphenylamine(2)	1,000 U
fluorene	1,000 U	phenanthrene	1,000 U
hexachlorobenzene	1,000 U	pyrene	1,000 U
hexachlorobutadiene	1,000 U	1,2,4-trichlorobenzene	1,000 U
hexachlorocyclopentadiene	1,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01

Lab Sample ID: K3232

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	1,000 U	2-nitrophenol	1,000 U
2-chlorophenol	1,000 U	4-nitrophenol	5,000 U
2,4-dichlorophenol	1,000 U	pentachlorophenol	5,000 U
2,4-dimethylphenol	1,000 U	phenol	1,000 U
2,4-dinitrophenol	5,000 U	2,4,6-trichlorophenol	1,000 U
2-methyl-4,6-dinitrophenol	5,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/09/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-01

Lab Sample ID: K3232

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown	34,000
2-hexadecanol	33,000
ethanol, 2-(dodecyloxy)-	32,000
unknown	56,000
1-dodecanol	27,000
unknown	26,000
1-tetradecanol	26,000
ethanol, 2-(dodecyloxy)-	25,000
unknown	43,000
unknown	41,000
unknown	28,000
1-hexadecanol	9,400
ethanol, 2-(hexadecyloxy)-	7,300
unknown	11,000
unknown	9,000
unknown	7,700
unknown	4,200
unknown	6,300
unknown	4,900
cyclododecane	1,900
unknown	2,100
cyclododecanol	1,600
1-hexadecanol	1,500
unknown	2,400
decanedioic acid, didecyl ester	1,000

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02

Lab Sample ID: K3233

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02

Lab Sample ID: K3233

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	2 J	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02
Lab Sample ID: K3233

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-02

Lab Sample ID: K3233

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-met
benzothiazole, 2-(methylthio)-

22 AB
16

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03
Lab Sample ID: K3234

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03

Lab Sample ID: K3234

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03

Lab Sample ID: K3234

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-03
Lab Sample ID: K3234

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-met
benzothiazole
benzothiazole, 2-(methylthio

51 AB
9.5
6.4

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04

Lab Sample ID: K3235

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	1,000 U	bis(2-chloroisopropyl)ether	1,000 U
acenaphthylene	1,000 U	bis(2-ethylhexyl)phthalate	360 J
anthracene	1,000 U	4-bromophenyl phenyl ether	1,000 U
benzidine	5,000 U	2-chloronaphthalene	1,000 U
benzo(a)anthracene	1,000 U	4-chlorophenyl phenyl ether	1,000 U
benzo(b)fluoranthene	1,000 U	chrysene	1,000 U
benzo(k)fluoranthene	1,000 U	dibenz(a,h)anthracene	1,000 U
benzo(a)pyrene	1,000 U	di-n-butylphthalate	1,000 U
benzo(g,h,i)perylene	1,000 U	1,2-dichlorobenzene	1,000 U
butylbenzylphthalate	1,000 U	1,3-dichlorobenzene	1,000 U
bis(2-chloroethoxy)methane	1,000 U	1,4-dichlorobenzene	1,000 U
bis(2-chloroethyl)ether	1,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/11/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04

Lab Sample ID: K3235

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	2,000 U	hexachloroethane	1,000 U
diethylphthalate	1,000 U	indeno(1,2,3-cd)pyrene	1,000 U
dimethyl phthalate	1,000 U	isophorone	1,000 U
2,4-dinitrotoluene	1,000 U	naphthalene	1,000 U
2,6-dinitrotoluene	1,000 U	nitrobenzene	1,000 U
di-n-octyl phthalate	1,000 U	n-nitroso-di-n-propylamine	1,000 U
1,2-diphenylhydrazine(1)	1,000 U	n-nitrosodimethylamine	1,000 U
fluoranthene	1,000 U	n-nitrosodiphenylamine(2)	1,000 U
fluorene	1,000 U	phenanthrene	1,000 U
hexachlorobenzene	1,000 U	pyrene	1,000 U
hexachlorobutadiene	1,000 U	1,2,4-trichlorobenzene	1,000 U
hexachlorocyclopentadiene	1,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/11/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04

Lab Sample ID: K3235

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	1,000 U	2-nitrophenol	1,000 U
2-chlorophenol	1,000 U	4-nitrophenol	5,000 U
2,4-dichlorophenol	1,000 U	pentachlorophenol	5,000 U
2,4-dimethylphenol	1,000 U	phenol	1,000 U
2,4-dinitrophenol	5,000 U	2,4,6-trichlorophenol	1,000 U
2-methyl-4,6-dinitrophenol	5,000 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/11/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-066-04

Lab Sample ID: K3235

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown	2,500
9-octadecenoic acid (Z)-, 2,	1,800
unknown (UNSAT'D?)	880

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3236

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	11 U	bis(2-chloroisopropyl)ether	11 U
acenaphthylene	11 U	bis(2-ethylhexyl)phthalate	11 U
anthracene	11 U	4-bromophenyl phenyl ether	11 U
benzidine	53 U	2-chloronaphthalene	11 U
benzo(a)anthracene	11 U	4-chlorophenyl phenyl ether	11 U
benzo(b)fluoranthene	11 U	chrysene	11 U
benzo(k)fluoranthene	11 U	dibenz(a,h)anthracene	11 U
benzo(a)pyrene	11 U	di-n-butylphthalate	11 U
benzo(g,h,i)perylene	11 U	1,2-dichlorobenzene	11 U
butylbenzylphthalate	3 J	1,3-dichlorobenzene	11 U
bis(2-chloroethoxy)methane	11 U	1,4-dichlorobenzene	11 U
bis(2-chloroethyl)ether	11 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3236

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	21 U	hexachloroethane	11 U
diethylphthalate	11 U	indeno(1,2,3-cd)pyrene	11 U
dimethyl phthalate	11 U	isophorone	11 U
2,4-dinitrotoluene	11 U	naphthalene	11 U
2,6-dinitrotoluene	11 U	nitrobenzene	11 U
di-n-octyl phthalate	11 U	n-nitroso-di-n-propylamine	11 U
1,2-diphenylhydrazine(1)	11 U	n-nitrosodimethylamine	11 U
fluoranthene	11 U	n-nitrosodiphenylamine(2)	11 U
fluorene	11 U	phenanthrene	11 U
hexachlorobenzene	11 U	pyrene	11 U
hexachlorobutadiene	11 U	1,2,4-trichlorobenzene	11 U
hexachlorocyclopentadiene	11 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3236

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	11 U	2-nitrophenol	11 U
2-chlorophenol	11 U	4-nitrophenol	53 U
2,4-dichlorophenol	11 U	pentachlorophenol	53 U
2,4-dimethylphenol	98	phenol	11 U
2,4-dinitrophenol	53 U	2,4,6-trichlorophenol	11 U
2-methyl-4,6-dinitrophenol	53 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-01

Lab Sample ID: K3236

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-met	60	AB
benzothiazole	22	
benzene, -ethyl-methyl-	31	Y
benzene, -ethyl-methyl-	20	Y
benzene, -ethyl-methyl-	20	Y
benzene, -ethyl-methyl-	14	Y

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
- B - Analyte was found in the blank as well as the sample.
- Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02
Lab Sample ID: K3237

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	11 U	bis(2-chloroisopropyl)ether	11 U
acenaphthylene	11 U	bis(2-ethylhexyl)phthalate	11 U
anthracene	11 U	4-bromophenyl phenyl ether	11 U
benzidine	53 U	2-chloronaphthalene	11 U
benzo(a)anthracene	11 U	4-chlorophenyl phenyl ether	11 U
benzo(b)fluoranthene	11 U	chrysene	11 U
benzo(k)fluoranthene	11 U	dibenz(a,h)anthracene	11 U
benzo(a)pyrene	11 U	di-n-butylphthalate	11 U
benzo(g,h,i)perylene	11 U	1,2-dichlorobenzene	11 U
butylbenzylphthalate	11 U	1,3-dichlorobenzene	11 U
bis(2-chloroethoxy)methane	11 U	1,4-dichlorobenzene	11 U
bis(2-chloroethyl)ether	11 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02

Lab Sample ID: K3237

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	21 U	hexachloroethane	11 U
diethylphthalate	11 U	indeno(1,2,3-cd)pyrene	11 U
dimethyl phthalate	11 U	isophorone	11 U
2,4-dinitrotoluene	11 U	naphthalene	11 U
2,6-dinitrotoluene	11 U	nitrobenzene	11 U
di-n-octyl phthalate	11 U	n-nitroso-di-n-propylamine	11 U
1,2-diphenylhydrazine(1)	11 U	n-nitrosodimethylamine	11 U
fluoranthene	11 U	n-nitrosodiphenylamine(2)	11 U
fluorene	11 U	phenanthrene	11 U
hexachlorobenzene	11 U	pyrene	11 U
hexachlorobutadiene	11 U	1,2,4-trichlorobenzene	11 U
hexachlorocyclopentadiene	11 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02

Lab Sample ID: K3237

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	11 U	2-nitrophenol	11 U
2-chlorophenol	11 U	4-nitrophenol	53 U
2,4-dichlorophenol	11 U	pentachlorophenol	53 U
2,4-dimethylphenol	11 U	phenol	11 U
2,4-dinitrophenol	53 U	2,4,6-trichlorophenol	11 U
2-methyl-4,6-dinitrophenol	53 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-02

Lab Sample ID: K3237

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-met
benzothiazole

46 AB
22

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

B - Analyte was found in the blank as well as the sample.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03

Lab Sample ID: K3238

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	11 U	bis(2-chloroisopropyl)ether	11 U
acenaphthylene	11 U	bis(2-ethylhexyl)phthalate	11 U
anthracene	11 U	4-bromophenyl phenyl ether	11 U
benzidine	53 U	2-chloronaphthalene	11 U
benzo(a)anthracene	11 U	4-chlorophenyl phenyl ether	11 U
benzo(b)fluoranthene	11 U	chrysene	11 U
benzo(k)fluoranthene	11 U	dibenz(a,h)anthracene	11 U
benzo(a)pyrene	11 U	di-n-butylphthalate	11 U
benzo(g,h,i)perylene	11 U	1,2-dichlorobenzene	11 U
butylbenzylphthalate	2 J	1,3-dichlorobenzene	11 U
bis(2-chloroethoxy)methane	11 U	1,4-dichlorobenzene	11 U
bis(2-chloroethyl)ether	11 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03

Lab Sample ID: K3238

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	21 U	hexachloroethane	11 U
diethylphthalate	11 U	indeno(1,2,3-cd)pyrene	11 U
dimethyl phthalate	11 U	isophorone	11 U
2,4-dinitrotoluene	11 U	naphthalene	11 U
2,6-dinitrotoluene	11 U	nitrobenzene	11 U
di-n-octyl phthalate	11 U	n-nitroso-di-n-propylamine	11 U
1,2-diphenylhydrazine(1)	11 U	n-nitrosodimethylamine	11 U
fluoranthene	11 U	n-nitrosodiphenylamine(2)	11 U
fluorene	11 U	phenanthrene	11 U
hexachlorobenzene	11 U	pyrene	11 U
hexachlorobutadiene	11 U	1,2,4-trichlorobenzene	11 U
hexachlorocyclopentadiene	11 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03

Lab Sample ID: K3238

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	11 U	2-nitrophenol	11 U
2-chlorophenol	11 U	4-nitrophenol	53 U
2,4-dichlorophenol	11 U	pentachlorophenol	53 U
2,4-dimethylphenol	11 U	phenol	11 U
2,4-dinitrophenol	53 U	2,4,6-trichlorophenol	11 U
2-methyl-4,6-dinitrophenol	53 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-03
Lab Sample ID: K3238

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzothiazole	33
2-pentanone, 4-hydroxy-4-met	12 AB

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
- B - Analyte was found in the blank as well as the sample.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04
Lab Sample ID: K3239

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	13 U	bis(2-chloroisopropyl)ether	13 U
acenaphthylene	13 U	bis(2-ethylhexyl)phthalate	13 U
anthracene	13 U	4-bromophenyl phenyl ether	13 U
benzidine	64 U	2-chloronaphthalene	13 U
benzo(a)anthracene	13 U	4-chlorophenyl phenyl ether	13 U
benzo(b)fluoranthene	13 U	chrysene	13 U
benzo(k)fluoranthene	13 U	dibenz(a,h)anthracene	13 U
benzo(a)pyrene	13 U	di-n-butylphthalate	13 U
benzo(g,h,i)perylene	13 U	1,2-dichlorobenzene	13 U
butylbenzylphthalate	13 U	1,3-dichlorobenzene	13 U
bis(2-chloroethoxy)methane	13 U	1,4-dichlorobenzene	13 U
bis(2-chloroethyl)ether	13 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04

Lab Sample ID: K3239

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'dichlorobenzidine	26 U	hexachloroethane	13 U
diethylphthalate	13 U	indeno(1,2,3-cd)pyrene	13 U
dimethyl phthalate	13 U	isophorone	13 U
2,4-dinitrotoluene	13 U	naphthalene	13 U
2,6-dinitrotoluene	13 U	nitrobenzene	13 U
di-n-octyl phthalate	13 U	n-nitroso-di-n-propylamine	13 U
1,2-diphenylhydrazine(1)	13 U	n-nitrosodimethylamine	13 U
fluoranthene	13 U	n-nitrosodiphenylamine(2)	13 U
fluorene	13 U	phenanthrene	13 U
hexachlorobenzene	13 U	pyrene	13 U
hexachlorobutadiene	13 U	1,2,4-trichlorobenzene	13 U
hexachlorocyclopentadiene	13 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04
Lab Sample ID: K3239

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	13 U	2-nitrophenol	13 U
2-chlorophenol	13 U	4-nitrophenol	64 U
2,4-dichlorophenol	13 U	pentachlorophenol	64 U
2,4-dimethylphenol	13 U	phenol	13 U
2,4-dinitrophenol	64 U	2,4,6-trichlorophenol	13 U
2-methyl-4,6-dinitrophenol	64 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-068-04

Lab Sample ID: K3239

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0679

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	10 U	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92
Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: H0679

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

IT Corporation
June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank

Lab Sample ID: H0679

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/02/92

Date of Analysis: 06/08/92

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June 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank
Lab Sample ID: H0679

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-methyl-

32 A

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51491

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1045-066-01	D	D	D	D	D	D
1045-066-02	91	86	86	40	53	62
1045-066-03	89	87	76	43	53	58
1045-066-04	D	D	D	D	D	D
1045-068-01	93	84	76	43	52	61
1045-068-02	89	81	69	41	47	55
1045-068-03	81	77	70	40	50	59
1045-068-04	83	81	74	44	50	58
Method Blank	93	88	85	41	55	64

*Values in parenthesis represent QC limits.

D - Surrogates diluted out

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3274

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	1,000 U	1,1-dichloroethene	500 U
acrylonitrile	1,000 U	cis-1,2-dichloroethene	500 U
benzene	500 U	trans-1,2-dichloroethene	500 U
bromodichloromethane	500 U	1,2-dichloropropane	500 U
bromoform	500 U	cis-1,3-dichloropropene	500 U
bromomethane	1,000 U	trans-1,3-dichloropropene	500 U
carbon tetrachloride	500 U	ethyl benzene	500 U
chlorobenzene	500 U	methylene chloride	1,800 B
chloroethane	1,000 U	1,1,2,2-tetrachloroethane	500 U
2-chloroethylvinyl ether	1,000 U	tetrachloroethene	500 U
chloroform	500 U	toluene	500 U
chloromethane	1,000 U	1,1,1-trichloroethane	500 U
dibromochloromethane	500 U	1,1,2-trichloroethane	500 U
1,1-dichloroethane	500 U	trichloroethene	500 U
1,2-dichloroethane	500 U	trichlorofluoromethane	500 U
		vinyl chloride	1,000 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/05/92

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June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3274

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	5,700 Y
benzene, 1,2-dimethyl-	2,900
unknown (substituted alkane)	520
unknown (alcohol?)	740
decane	940
undecane	1,400

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3275

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	6	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	3 J
chlorobenzene	5 U	methylene chloride	410 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	6	toluene	14
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/08/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3275

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-
benzene, 1,2-dimethyl-

50 Y
9.2

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3276

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	2 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	2 J
chlorobenzene	5 U	methylene chloride	4,800 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	22	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/05/92

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June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3276

Tentative Identification (1)

Concentration (2)

benzene, dimethyl-
benzene, 1,2-dimethyl-

23 Y
7.7

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04

Lab Sample ID: K3277

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	50 U	1,1-dichloroethene	25 U
acrylonitrile	50 U	cis-1,2-dichloroethene	25 U
benzene	13 J	trans-1,2-dichloroethene	25 U
bromodichloromethane	25 U	1,2-dichloropropane	25 U
bromoform	25 U	cis-1,3-dichloropropene	25 U
bromomethane	50 U	trans-1,3-dichloropropene	25 U
carbon tetrachloride	25 U	ethyl benzene	25 U
chlorobenzene	25 U	methylene chloride	68 B
chloroethane	50 U	1,1,2,2-tetrachloroethane	25 U
2-chloroethylvinyl ether	50 U	tetrachloroethene	25 U
chloroform	21 J	toluene	20 J
chloromethane	50 U	1,1,1-trichloroethane	25 U
dibromochloromethane	25 U	1,1,2-trichloroethane	25 U
1,1-dichloroethane	25 U	trichloroethene	25 U
1,2-dichloroethane	25 U	trichlorofluoromethane	25 U
		vinyl chloride	50 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/05/92

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04
Lab Sample ID: K3277

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
pentane	66
hexane	68
octane	56
benzene, dimethyl-	41 Y

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB0605

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/05/92

This method blank applies to the following samples: 1045-069-01, 1045-069-02 DL, 1045-069-03, 1045-069-03 DL.

DL - Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: WB0605

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: WB06052

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/05/92

This method blank applies to the following sample: 1045-069-04.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: WB06052

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: WB0608

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/08/92

This method blank applies to the following sample: 1045-069-02.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 3
Lab Sample ID: WB0608

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

WATER SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(88-110%)*</u>	<u>BFB</u> <u>(86-115%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(76-114%)*</u>
1045-069-01	98	95	98
1045-069-02	103	99	100
1045-069-02 DL	96	95	100
1045-069-03	95	93	91
1045-069-03 DL	103	102	104
1045-069-04	109	90	94
Method Blank 1	97	93	96
Method Blank 2	101	97	98
Method Blank 3	102	96	97

*Values in parenthesis represent QC limits.

DL - Dilution

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in total μg
Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB06192

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/19/92

This method blank applies to the following samples: 1045-069-05B, 1045-069-05T, 1045-069-06T, 1045-069-07T, 1045-069-07T DL, 1045-069-07T DL2, 1045-069-08T.

DL - Dilution.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: WB06192

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: WB0622R2

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/22/92

This method blank applies to the following samples: 1045-069-05B DL, 1045-069-05B DL2, 1045-069-05M, 1045-069-05M DL.

DL - Dilution.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: WB0622R2

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: WB06224

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	2 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/22/92

This method blank applies to the following samples: 1045-069-06B, 1045-069-06B DL, 1045-069-06M, 1045-069-06M DL, 1045-069-07M, 1045-069-08M.

DL - Dilution.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: Water

Client Sample ID: Method Blank 3

Lab Sample ID: WB06224

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: Water

Client Sample ID: Method Blank 4
Lab Sample ID: WB0623

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	1 J
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Analysis: 06/23/92

This method blank applies to the following samples: 1045-069-07M DL, 1045-069-08B.

DL - Dilution.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: Water

Client Sample ID: Method Blank 4
Lab Sample ID: WB0623

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOST SURROGATE PERCENT RECOVERY SUMMARY

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(81-117%)*</u>	<u>BFB</u> <u>(74-121%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(70-121%)*</u>
1045-069-05B	19 **	29 **	10 **
1045-069-05B DL	66 **	69 **	75
1045-069-05B DL2	39 **	39 **	48 **
1045-069-05M	65 **	51 **	72 **
1045-069-05M DL	64 **	54 **	80
1045-069-05T	26 **	18 **	46 **
1045-069-06B	86	94	95
1045-069-06B DL	91	98	115
1045-069-06M	60 **	55 **	88
1045-069-06M DL	62 **	58 **	96
1045-069-06T	83	75	88
1045-069-07M	39 **	37 **	83
1045-069-07M DL	47 **	48 **	105
1045-069-07T	79 **	80	83
1045-069-07T DL	57 **	68 **	63 **
1045-069-07T DL2	56 **	68 **	67 **

*Values in parenthesis represent required QC limits.

**Values outside of required QC limits.

DL - Dilution

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOST SURROGATE PERCENT RECOVERY SUMMARY (continued)

<u>Client Sample ID</u>	<u>VOLATILE</u>		
	<u>Toluene-D8</u> <u>(81-117%)*</u>	<u>BFB</u> <u>(74-121%)*</u>	<u>1,2 Dichloroethane-D4</u> <u>(70-121%)*</u>
1045-069-08B	77 **	70 **	85
1045-069-08M	87	79	97
1045-069-08T	82	71 **	87
Method Blank 1	95	89	94
Method Blank 2	108	97	99
Method Blank 3	97	96	94
Method Blank 4	101	94	95

*Values in parenthesis represent required QC limits.

**Values outside of required QC limits.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3278

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	62 U	bis(2-chloroisopropyl)ether	62 U
acenaphthylene	62 U	bis(2-ethylhexyl)phthalate	6,500 D
anthracene	62 U	4-bromophenyl phenyl ether	62 U
benzidine	310 U	2-chloronaphthalene	62 U
benzo(a)anthracene	62 U	4-chlorophenyl phenyl ether	62 U
benzo(b)fluoranthene	62 U	chrysene	62 U
benzo(k)fluoranthene	62 U	dibenz(a,h)anthracene	62 U
benzo(a)pyrene	62 U	di-n-butylphthalate	62 U
benzo(g,h,i)perylene	62 U	1,2-dichlorobenzene	62 U
butylbenzylphthalate	62 U	1,3-dichlorobenzene	62 U
bis(2-chloroethoxy)methane	62 U	1,4-dichlorobenzene	62 U
bis(2-chloroethyl)ether	62 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
D - Compound analyzed at a secondary dilution factor.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3278

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	120 U	hexachloroethane	62 U
diethylphthalate	62 U	indeno(1,2,3-cd)pyrene	62 U
dimethyl phthalate	62 U	isophorone	62 U
2,4-dinitrotoluene	62 U	naphthalene	62 U
2,6-dinitrotoluene	62 U	nitrobenzene	62 U
di-n-octyl phthalate	24 J	n-nitroso-di-n-propylamine	62 U
1,2-diphenylhydrazine(1)	62 U	n-nitrosodimethylamine	62 U
fluoranthene	62 U	n-nitrosodiphenylamine(2)	62 U
fluorene	62 U	phenanthrene	62 U
hexachlorobenzene	62 U	pyrene	62 U
hexachlorobutadiene	62 U	1,2,4-trichlorobenzene	62 U
hexachlorocyclopentadiene	62 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3278

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	62 U	2-nitrophenol	62 U
2-chlorophenol	62 U	4-nitrophenol	310 U
2,4-dichlorophenol	62 U	pentachlorophenol	310 U
2,4-dimethylphenol	62 U	phenol	62 U
2,4-dinitrophenol	310 U	2,4,6-trichlorophenol	62 U
2-methyl-4,6-dinitrophenol	310 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-01

Lab Sample ID: K3278

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
1-dodecanol	8,000
1-dodecanol	8,300
ethanol, 2-(dodecyloxy)-	9,200
1-hexadecanol	5,400
ethanol, 2-(dodecyloxy)-	8,200
ethanol, 2-[(2-ethylhexyl) oxy]-	9,300
ethanol, 2-(hexadecyloxy)-	5,300
unknown	8,600
2-undecanol	8,900
unknown	6,400
unknown	8,500
unknown	8,500
unknown	6,400
unknown	8,100
unknown	8,200
unknown	5,400
unknown	7,500
unknown	7,400
unknown	5,200
unknown	5,800

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

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June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3279

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	2 J
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	4 JB	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3279

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3279

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-02

Lab Sample ID: K3279

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
cyclohexane, isocyanato-	14
benzothiazole	25
cyclohexane, isothiocyanato-	76
hydroxylamine, o-decyl-	16
unknown	13
trans-2,3-epoxydecane	18
unknown (alcohol?)	14
unknown	21
unknown	15
unknown	21
unknown	20
unknown	23
unknown (Crown?)	120
unknown	42
unknown	220
unknown (Crown?)	20
unknown	14
unknown (Crown?)	44
unknown	22
unknown	13

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3280

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	6 JB	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3280

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3280

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	3 J	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-03

Lab Sample ID: K3280

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
2-pentanone, 4-hydroxy-4-methyl-	14 AB
benzothiazole	25
cyclohexane, isothiocyanato-	18
1,1-dodecanediol, diacetate	11
decane, 1-fluoro-	13
benzothiazole, 2-(methylthio)-	13
trans-2,3-epoxydecane	12
unknown	15
unknown	24
unknown (Crown?)	12
unknown	26
1,4,7,10,13,16-hexaoxacyclooctadecane	12
unknown	13
unknown (Crown?)	49
1,4,7,10,13,16-hexaoxacyclooctadecane	17
unknown	16
unknown	14
unknown	42
1,4,7,10,13,16-hexaoxacyclooctadecane	14
1,4,7,10,13,16-hexaoxacyclooctadecane	26

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

- A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04

Lab Sample ID: K3281

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	50 U	bis(2-chloroisopropyl)ether	50 U
acenaphthylene	50 U	bis(2-ethylhexyl)phthalate	38 J
anthracene	50 U	4-bromophenyl phenyl ether	50 U
benzidine	250 U	2-chloronaphthalene	50 U
benzo(a)anthracene	50 U	4-chlorophenyl phenyl ether	50 U
benzo(b)fluoranthene	50 U	chrysene	50 U
benzo(k)fluoranthene	50 U	dibenz(a,h)anthracene	50 U
benzo(a)pyrene	50 U	di-n-butylphthalate	50 U
benzo(g,h,i)perylene	50 U	1,2-dichlorobenzene	50 U
butylbenzylphthalate	50 U	1,3-dichlorobenzene	50 U
bis(2-chloroethoxy)methane	50 U	1,4-dichlorobenzene	50 U
bis(2-chloroethyl)ether	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04

Lab Sample ID: K3281

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'dichlorobenzidine	100 U	hexachloroethane	50 U
diethylphthalate	50 U	indeno(1,2,3-cd)pyrene	50 U
dimethyl phthalate	50 U	isophorone	50 U
2,4-dinitrotoluene	50 U	naphthalene	50 U
2,6-dinitrotoluene	50 U	nitrobenzene	50 U
di-n-octyl phthalate	50 U	n-nitroso-di-n-propylamine	50 U
1,2-diphenylhydrazine(1)	50 U	n-nitrosodimethylamine	50 U
fluoranthene	50 U	n-nitrosodiphenylamine(2)	50 U
fluorene	50 U	phenanthrene	50 U
hexachlorobenzene	50 U	pyrene	50 U
hexachlorobutadiene	50 U	1,2,4-trichlorobenzene	50 U
hexachlorocyclopentadiene	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04

Lab Sample ID: K3281

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	50 U	2-nitrophenol	50 U
2-chlorophenol	50 U	4-nitrophenol	250 U
2,4-dichlorophenol	50 U	pentachlorophenol	250 U
2,4-dimethylphenol	50 U	phenol	50 U
2,4-dinitrophenol	250 U	2,4,6-trichlorophenol	50 U
2-methyl-4,6-dinitrophenol	250 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04

Lab Sample ID: K3281

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
hexanal	190
heptanal	290
2-nonenal, (E)-	210
octanoic acid	260
cyclopropane, 1-heptyl-2-methyl-	260
nonanoic acid	210
1-dodecanol	290
decanoic acid	220
dodecanoic acid	680
tetradecanoic acid	970
9-hexadecenoic acid	970
hexadecanoic acid	920
2-octadecenal	4,000
9-octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	720
unknown	1,100
1,4,7,10,13,16-hexaoxacyclooctadecane	230
unknown	890
unknown (Ester?)	220
unknown (Ester?)	1,300
unknown	450

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04 RE

Lab Sample ID: K3281 RE

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	266 U	bis(2-chloroisopropyl)ether	266 U
acenaphthylene	266 U	bis(2-ethylhexyl)phthalate	90 J
anthracene	266 U	4-bromophenyl phenyl ether	266 U
benzidine	665 U	2-chloronaphthalene	266 U
benzo(a)anthracene	266 U	4-chlorophenyl phenyl ether	266 U
benzo(b)fluoranthene	266 U	chrysene	266 U
benzo(k)fluoranthene	266 U	dibenz(a,h)anthracene	266 U
benzo(a)pyrene	266 U	di-n-butylphthalate	266 U
benzo(g,h,i)perylene	266 U	1,2-dichlorobenzene	266 U
butylbenzylphthalate	266 U	1,3-dichlorobenzene	266 U
bis(2-chloroethoxy)methane	266 U	1,4-dichlorobenzene	266 U
bis(2-chloroethyl)ether	266 U		

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/24/92

Date of Analysis: 06/26/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04 RE

Lab Sample ID: K3281 RE

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	665 U	hexachloroethane	266 U
diethylphthalate	266 U	indeno(1,2,3-cd)pyrene	266 U
dimethyl phthalate	266 U	isophorone	266 U
2,4-dinitrotoluene	266 U	naphthalene	266 U
2,6-dinitrotoluene	266 U	nitrobenzene	266 U
di-n-octyl phthalate	266 U	n-nitroso-di-n-propylamine	266 U
1,2-diphenylhydrazine(1)	266 U	n-nitrosodimethylamine	266 U
fluoranthene	266 U	n-nitrosodiphenylamine(2)	266 U
fluorene	266 U	phenanthrene	266 U
hexachlorobenzene	266 U	pyrene	266 U
hexachlorobutadiene	266 U	1,2,4-trichlorobenzene	266 U
hexachlorocyclopentadiene	266 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/24/92

Date of Analysis: 06/26/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04 RE

Lab Sample ID: K3281 RE

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	266 U	2-nitrophenol	266 U
2-chlorophenol	266 U	4-nitrophenol	665 U
2,4-dichlorophenol	266 U	pentachlorophenol	665 U
2,4-dimethylphenol	266 U	phenol	266 U
2,4-dinitrophenol	665 U	2,4,6-trichlorophenol	266 U
2-methyl-4,6-dinitrophenol	665 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/24/92

Date of Analysis: 06/26/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: 1045-069-04 RE

Lab Sample ID: K3281 RE

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
dodecanoic acid	3,700
tetradecanoic acid	8,400
9-hexadecenoic acid	12,000
hexadecanoic acid	12,000
unknown	3,500
ethanol, 2,2'-[oxybis(2,1-ET	2,800
unknown	38,000
15-crown-5	10,000
unknown	3,100
unknown	5,500
15-crown-5	17,000
unknown	4,000
unknown	3,000
1,4,7,10,13,16-hexaoxacyclooctadecane	26,000
unknown	6,100
unknown	6,400
1,4,7,10,13,16-hexaoxacyclooctadecane	16,000
unknown	4,500
unknown	4,100
1,4,7,10,13,16-hexaoxacyclooctadecane	4,600

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: BL0863

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	50 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	3 J	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: BL0863

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	20 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

This method blank applies to the following samples: 1045-069-01, 1045-069-02, 1045-069-03 and 1045-069-04.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1

Lab Sample ID: BL0863

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	50 U
2,4-dichlorophenol	10 U	pentachlorophenol	50 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	50 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	50 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/03/92

Date of Analysis: 06/11/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BL0863

Tentative Identification (1)

Concentration (2)

2-pentanone, 4-hydroxy-4-methyl-

36 A

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: BL0840

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acenaphthene	10 U	bis(2-chloroisopropyl)ether	10 U
acenaphthylene	10 U	bis(2-ethylhexyl)phthalate	10 U
anthracene	10 U	4-bromophenyl phenyl ether	10 U
benzidine	25 U	2-chloronaphthalene	10 U
benzo(a)anthracene	10 U	4-chlorophenyl phenyl ether	10 U
benzo(b)fluoranthene	10 U	chrysene	10 U
benzo(k)fluoranthene	10 U	dibenz(a,h)anthracene	10 U
benzo(a)pyrene	10 U	di-n-butylphthalate	10 U
benzo(g,h,i)perylene	10 U	1,2-dichlorobenzene	10 U
butylbenzylphthalate	1 J	1,3-dichlorobenzene	10 U
bis(2-chloroethoxy)methane	10 U	1,4-dichlorobenzene	10 U
bis(2-chloroethyl)ether	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/24/92

Date of Analysis: 06/26/92

Client Project ID: LE Carpenter

Job Number: ITPK 51499

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2

Lab Sample ID: BL0840

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
3,3'-dichlorobenzidine	25 U	hexachloroethane	10 U
diethylphthalate	10 U	indeno(1,2,3-cd)pyrene	10 U
dimethyl phthalate	10 U	isophorone	10 U
2,4-dinitrotoluene	10 U	naphthalene	10 U
2,6-dinitrotoluene	10 U	nitrobenzene	10 U
di-n-octyl phthalate	10 U	n-nitroso-di-n-propylamine	10 U
1,2-diphenylhydrazine(1)	10 U	n-nitrosodimethylamine	10 U
fluoranthene	10 U	n-nitrosodiphenylamine(2)	10 U
fluorene	10 U	phenanthrene	10 U
hexachlorobenzene	10 U	pyrene	10 U
hexachlorobutadiene	10 U	1,2,4-trichlorobenzene	10 U
hexachlorocyclopentadiene	10 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene

(2) - Detected as diphenylamine

Date of Extraction: 06/24/92

Date of Analysis: 06/26/92

This method blank applies to the following samples: 1045-069-04 RE.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BL0840

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
4-chloro-3-methylphenol	10 U	2-nitrophenol	10 U
2-chlorophenol	10 U	4-nitrophenol	25 U
2,4-dichlorophenol	10 U	pentachlorophenol	25 U
2,4-dimethylphenol	10 U	phenol	10 U
2,4-dinitrophenol	25 U	2,4,6-trichlorophenol	10 U
2-methyl-4,6-dinitrophenol	25 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 06/24/92
Date of Analysis: 06/26/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in $\mu\text{g/liter}$ (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BL0840

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
unknown	28
benzene,1,1'-sulfonylbis[4-	26
acetic acid, (triphenylphosp	68

Remarks:

- (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	<u>Nitro- Benzene-D5 (35-114%)*</u>	<u>2-Fluoro- Biphenyl (43-116%)*</u>	<u>Terphenyl- D14 (33-141%)*</u>	<u>Phenol-D5 (10-94%)*</u>	<u>2-Fluoro- Phenol (21-100%)*</u>	<u>2,4,6- Tribromo- Phenol (10-123%)*</u>
1045-069-01	57	54	49	42	50	32
1045-069-01 DL	D	D	D	D	D	D
1045-069-02	62	69	81	33	47	77
1045-069-03	76	58	87	34	50	75
1045-069-04	30 **	34 **	38	31	46	73
Method Blank 1	77	85	94	33	53	75

*Values in parenthesis represent required QC limits.

**Values outside required QC limits.

D - Surrogates diluted out.

DL - Dilution.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

WATER SURROGATE PERCENT RECOVERY SUMMARY

SEMI-VOLATILE

<u>Client Sample ID</u>	Nitro- Benzene-D5 (35-114%)*	2-Fluoro- Biphenyl (43-116%)*	Terphenyl- D14 (33-141%)*	Phenol-D5 (10-94%)*	2-Fluoro- Phenol (21-100%)*	2,4,6- Tribromo- Phenol (10-123%)*
1045-069-04 RE	79	94	92	102 **	96	88
Method Blank 2	78	83	86	77	74	85

*Values in parenthesis represent required QC limits.

**Values outside of required QC limits.

Appendix G

Tenax Resin Analyses

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05T

Lab Sample ID: K3270T

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	8 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/19/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05T
Lab Sample ID: K3270T

Tentative Identification (1)

Concentration (2)

Unknown

5.3

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05M

Lab Sample ID: K3270MR

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	6	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	380 BD
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	7	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/22/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05M
Lab Sample ID: K3270MR

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
carbon disulfide	15
unknown	5.4
cyclohexane, 1,1,2,3-tetrame	6.6

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05B

Lab Sample ID: K3270B

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	48	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	430 D
chlorobenzene	5 U	methylene chloride	170 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	15	toluene	140 D
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/19/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-05B

Lab Sample ID: K3270B

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
benzene, dimethyl-	240 Y
cyclopentane, 1-hexyl-3-methyl-	21
undecane, 5,6-dimethyl-	29
octane, 3,5-dimethyl-	61
nonane, 3-methyl-	37
benzene, ethylmethyl-	61 Y
2-dodecen-1-oL, 12-chloro-	40
decane, 2,5,6-trimethyl-	44
benzene, trimethyl-	47 Y
undecane	43

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μ g
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06T

Lab Sample ID: K3271T

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	3 JB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	1 J
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/19/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μ g

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06T
Lab Sample ID: K3271T

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μ g
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06M
Lab Sample ID: K3271M

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	240 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	2 J	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/22/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06M
Lab Sample ID: K3271M

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μ g
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06B

Lab Sample ID: K3271B

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	130	trans-1,2-dichloroethene	5 U
bromodichloromethane	2 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	62
chlorobenzene	5 U	methylene chloride	450 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	30	toluene	360 D
chloromethane	10 U	1,1,1-trichloroethane	2 J
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/22/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μ g

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-06B

Lab Sample ID: K3271B

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
ethane, 1,1,2-trichloro-1,2,	8.6
benzene, dimethyl-	1,300 Y
benzene, 1,2-dimethyl-	180

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-07T

Lab Sample ID: K3272T

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	72	trans-1,2-dichloroethene	5 U
bromodichloromethane	3 J	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	30
chlorobenzene	5 U	methylene chloride	4,700 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	62	toluene	240 D
chloromethane	10 U	1,1,1-trichloroethane	2 J
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/19/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μ g

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-07T
Lab Sample ID: K3272T

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
ethane, 1,1,2-trichloro-1,2,	15
benzene, dimethyl-	900 Y
benzene, 1,2-dimethyl-	120

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-07M

Lab Sample ID: K3272M

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	4,600 DB
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	6	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.
D - Compound analyzed at a secondary dilution factor.

Date of Analysis: 06/22/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-07M

Lab Sample ID: K3272M

Tentative Identification (1)

Concentration (2)

ethane, 1,1,2-trichloro-1,2,
carbon disulfide

5.5

6.7

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08T

Lab Sample ID: K3273T

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	5 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	1 J
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

J - Indicates an estimated value less than the detection limit.

B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/19/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08T

Lab Sample ID: K3273T

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μg
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08M

Lab Sample ID: K3273M

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	5 U	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	5 U
chlorobenzene	5 U	methylene chloride	8 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	5 U	toluene	5 U
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/22/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08M

Lab Sample ID: K3273M

Tentative Identification (1)

Concentration (2)

None Detected

Remarks:

(1) Identification is based on computer search of the NIST Library.

(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in Total μ g
Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08B

Lab Sample ID: K3273B

<u>Compound</u>	<u>Concentration</u>	<u>Compound</u>	<u>Concentration</u>
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	cis-1,2-dichloroethene	5 U
benzene	6	trans-1,2-dichloroethene	5 U
bromodichloromethane	5 U	1,2-dichloropropane	5 U
bromoform	5 U	cis-1,3-dichloropropene	5 U
bromomethane	10 U	trans-1,3-dichloropropene	5 U
carbon tetrachloride	5 U	ethyl benzene	10
chlorobenzene	5 U	methylene chloride	20 B
chloroethane	10 U	1,1,2,2-tetrachloroethane	5 U
2-chloroethylvinyl ether	10 U	tetrachloroethene	5 U
chloroform	11	toluene	10
chloromethane	10 U	1,1,1-trichloroethane	5 U
dibromochloromethane	5 U	1,1,2-trichloroethane	5 U
1,1-dichloroethane	5 U	trichloroethene	5 U
1,2-dichloroethane	5 U	trichlorofluoromethane	5 U
		vinyl chloride	10 U

- U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 06/23/92

IT Corporation
June 30, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITPK 51499

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in Total μg

Sample Matrix: VOST Tube

Client Sample ID: 1045-069-08B

Lab Sample ID: K3273B

<u>Tentative Identification (1)</u>	<u>Concentration (2)</u>
pentane	2,300
hexane	1,300
octane	290
benzene, dimethyl-	1,600 Y
benzene, 1,2-dimethyl-	320

Remarks:

- (1) Identification is based on computer search of the NIST Library.
- (2) Concentration is based on a response factor of 1.00 relative to the internal standard.

Y - Indistinguishable isomer in tentatively identified compounds.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923
Attn: Michael Krstich

May 1, 1992

Job Number: ITAD 51019

P.O. Number: 483048

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	03/26/92
Number of Samples:	Eight (8)
Sample Type:	Water - five (5), Soil - three (3)

I. Introduction

On 03/26/92, five (5) water samples and three (3) soil samples arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Technology Development Laboratory, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:



Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITAD 51019

II. Analytical Results/Methodology (continued)

Chemical oxygen demand (COD) was measured using the EPA approved HACH procedure, HACH Water Analysis Handbook, HACH Chemical Company, 1980.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs generally went well; however, samples 1045-055-2 and 1045-055-3 required necessary dilutions for methylene chloride and toluene. Sample 1045-052-1 had low toluene-d8 and dichloroethane-d4 surrogate recoveries. This appeared to have been due to matrix interference since a reanalysis showed similar results and additional samples analyzed after these samples had acceptable surrogate recoveries. Xylene was not a target and was reported as a TIC, but was quantified similar to a target compound using a continuing calibration standard. Sample 1045-055-1 required a dilution for xylene.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. The sample runs generally went well; however, high levels of various target phthalates were seen requiring dilutions. Two dilutions were required to quantify both bis(2-ethylhexyl)phthalate and butylbenzyl phthalate in sample 1045-052-3. The bis(2-ethylhexyl) phthalate calibration curve was slightly exceeded in the dilution of sample 1045-052-1. This parameter has, in our experience, been linear beyond the calibration range on this instrument, and the data was judged as reliable. High levels of xylene were seen in the BN extracts. There were no problems seen in final data review.

The COD of the samples was measured using the reactor digestion method followed by titration with ferrous ammonium sulfate. No problems were encountered.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923
Attn: Michael Krstich

May 1, 1992

Job Number: ITAD 51191

P.O. Number:

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	04/14/92
Number of Samples:	Six (6)
Sample Type:	Soil

I. Introduction

On 04/14/92, six (6) soil samples arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Technology Development Laboratory, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for total organic carbon (TOC) using modified EPA method 9060. The results should be considered nonpurgeable organic carbon since the sample preparation process may result in loss of volatiles.

Reviewed and Approved:



Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

IT Corporation
May 1, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51191

III. Quality Control

Routine laboratory level I QC was followed.

The TOC content of the samples was determined by chemical wet oxidation followed by infrared detection. Samples were weighed into glass ampules and mixed with a phosphoric acid/sodium persulfate solution. The phosphoric acid converts all inorganic carbon to carbon dioxide (CO₂) which is purged from the ampule with oxygen. The ampule is then sealed under oxygen and heated to approximately 100°C in a water bath for 30 minutes. The heating process converts the organic carbon to CO₂, which is trapped in the sealed ampule. The samples were analyzed by an O.I. Corporation total organic carbon analyzer, Model 700; the carbon was quantified using infrared detection by measuring the absorbance of CO₂. No major problems were encountered.



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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923
Attn: Michael Krstich

May 29, 1992

Job Number: ITAD 51254

P.O. Number: 483100.001

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	04/24/92
Number of Samples:	Four (4)
Sample Type:	Water

I. Introduction

On 04/24/92, four (4) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Technology Development Laboratory, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:

Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITAD 51254

II. Analytical Results/Methodology (continued)

Chemical oxygen demand (COD) was measured using the EPA approved HACH procedure, HACH Water Analysis Handbook, HACH Chemical Company, 1980.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs went well. Methylene chloride was found in several samples at levels requiring dilutions. Bromofluorobenzene was slightly high in undiluted analysis of sample 1045-061-1, but was compliant in the dilution, indicating a slight sample matrix effect. Overall analysis and method QC looked good. The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Fisons VG TRIO-1 GC/MS/DS. The sample runs went well. There were no problems seen in final data review.

The COD of the samples was measured using the reactor digestion method followed by titration with ferrous ammonium sulfate. No major problems were encountered.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923
Attn: Michael Krstich

May 27, 1992

Job Number: ITAD 51315

P.O. Number: 483100.001

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	05/05/92
Number of Samples:	Four (4)
Sample Type:	Water

I. Introduction

On 05/05/92, four (4) water samples arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Technology Development Laboratory, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

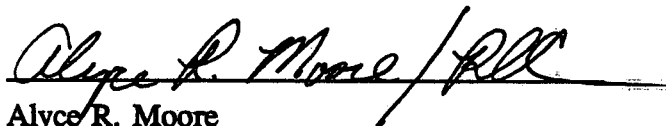
II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:



Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITAD 51315

II. Analytical Results/Methodology (continued)

Chemical oxygen demand (COD) was measured using the EPA approved HACH procedure, HACH Water Analysis Handbook, HACH Chemical Company, 1980.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on two Finnigan OWA GC/MS/DS units. The sample runs generally went well, however, interferences such as organic contaminants and surfactants did cause some problems. More concentrated analyses than reported were performed, but the interferences encountered rendered the data unreliable. For example, sample 1045-063-1 required a 100-fold dilution for successful analysis due to high surfactant levels and background from substituted benzenes and other hydrocarbons. Some dilutions were also required for quantification, e.g., sample 1045-063-3 was diluted 25-fold for methylene chloride. Overall, the method QC and analyses looked good.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Fisons VG TRIO-1 GC/MS/DS. The sample runs generally went well, however, some problems were encountered due to high levels of organic contamination in the samples. Originally a 1,000 ml aliquot of each sample was extracted, but sample 1045-063-1 and 1045-063-4 would not concentrate to the method required volume of 1.0 ml. Further dilutions would be required for analysis and surrogate data for these two samples would be lost, hence, reextractions of these samples were performed using 20 ml aliquots resulting in 50-fold dilutions with measurable surrogate recoveries. A further fivefold dilution was required of sample 1045-063-1 to quantify bis(2-ethylhexyl) phthalate. The high level of bis(2-ethylhexyl) phthalate in the original analysis of 1045-063-1 suppressed one of the internal standards resulting in one low internal standard area recovery and one high surrogate recovery. These anomalies disappeared in the subsequent dilution. There were no problems seen in final data review.

The COD of the samples was measured using the reactor digestion method followed by titration with ferrous ammonium sulfate. No major problems were encountered.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923
Attn: Michael Krstich

May 26, 1992

Job Number: ITAD 51328

P.O. Number: NA

This is the Certificate of Analysis for the following sample:

Client Project ID:	LE Carpenter
Date Received by Lab:	05/06/92
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction

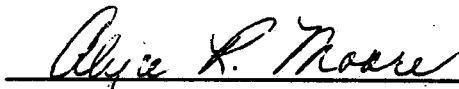
On 05/06/92, one (1) soil sample arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Technology Development Laboratory, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The sample was analyzed for total organic carbon (TOC) using modified EPA method 9060. The results should be considered nonpurgeable organic carbon since the sample preparation process may result in loss of volatiles.

Reviewed and Approved:



Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

IT Corporation
May 26, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LE Carpenter

Job Number: ITAD 51328

III. Quality Control

Routine laboratory level I QC was followed.

The TOC content of the sample was determined by chemical wet oxidation followed by infrared detection. The sample was weighed into a glass ampule and mixed with a phosphoric acid/sodium persulfate solution. The phosphoric acid converts all inorganic carbon to carbon dioxide (CO₂) which is purged from the ampule with oxygen. The ampule is then sealed under oxygen and heated to approximately 100°C in a water bath for 30 minutes. The heating process converts the organic carbon to CO₂ which is trapped in the sealed ampule. The sample was analyzed by an O.I. Corporation total organic carbon analyzer, Model 700; the carbon was quantified using infrared detection by measuring the absorbance of CO₂. No major problems were encountered.

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: Michael Krstich

June 23, 1992

Job Number: ITPK 51491

P.O. Number: 483100.001

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	06/01/92
Number of Samples:	Twelve (12)
Sample Type:	Water - eight (8), Soil - four (4)

I. Introduction

On 06/01/92, eight (8) water samples and four (4) soil samples arrived at the ITAS-Knoxville, Tennessee, laboratory from IT Corporation, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

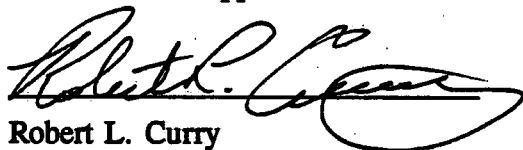
II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected, and soil samples were reported on a dry weight basis.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:



Robert L. Curry
Laboratory Systems Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITPK 51491

II. Analytical Results/Methodology (continued)

The samples were analyzed for total organic carbon (TOC) based on EPA methods 415.1 and 9060.

Chemical oxygen demand (COD) was measured using the EPA approved HACH procedure, HACH Water Analysis Handbook, HACH Chemical Company, 1980.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS 500 and OWA GC/MS/DS units. The sample runs went well, although there were several additional dilutions required. The initial run of 1045-068-01 showed one surrogate marginally outside limits, while the dilution met limits. The TIC analysis showed primarily cyclics, alkanes, and alkylbenzenes; the quality of the matches was better in some runs than others. The matches were tentative, and listed names should be taken as guides to compound type.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a VG TRIO-1 GC/MS/DS. The sample runs went well with the exception of the original run of 10456-067-01, in which some internal standard and surrogate variants were seen. The deviations were probably due to matrix effect from the high levels in the sample. Many extracts required dilution prior to analysis. As the samples contained a large number of components, TIC analysis was fairly involved: as for volatiles, it is suggested that the listed names be taken as guides to compound type, as the peaks sometimes had more than one reasonable spectral match, and also some spectra may have been overlapped in the generally crowded chromatogram. A number of phthalates were seen; in particular, bis(2-ethylhexyl) eluted in a general phthalate cluster, and judgement was used to distinguish the priority pollutant from the TICs (please note the TIC phthalates around 28.3 minutes which all showed similar spectra to the target compound, but were judged to be from similar but separate compounds). There were no other problems seen in final data review.



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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: Michael Krstich

June 30, 1992

Job Number: ITPK 51499

P.O. Number: 483100.001

This is the Certificate of Analysis for the following samples:

Client Project ID:	LE Carpenter
Date Received by Lab:	06/02/92
Number of Samples:	Eight (8)
Sample Type:	Water - four (4), XAD Tubes - four (4)

I. Introduction

On 06/02/92, four (4) water samples and four (4) XAD tubes arrived at the ITAS-Knoxville, Tennessee, laboratory from IT Corporation, Knoxville, Tennessee, in support of the LE Carpenter project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The samples were analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The water samples were analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:

Alyce R. Moore
Laboratory Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

Client Project ID: LE Carpenter

Job Number: ITPK 51499

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses on VOST tubes were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs generally went well considering the charcoal in the matrix. As expected, the surrogate recoveries were low compared to normal recovery ranges. Three VOST tubes were received for each sample: 1045-069-05, 1045-069-06 and 1045-069-08 labeled T, M, and. Two VOST tubes were received for 1045-069-07 labeled T and M. A single letter suffix was added to the sample names corresponding to the T, M, or B label. The B tubes exhibited the highest levels of target compounds requiring dilutions in most cases. Sample 1045-069-05B not only showed poor surrogate recovery, but also yielded a low internal standard area. This phenomenon was not present in the more dilute analyses and was considered an effect of matrix. The volatiles analyses on water samples were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan INCOS 500 GC/MS/DS. The sample runs went well; sample 1045-069-01 required dilution because of excessive foaming with the intital run. The TIC analysis was generally straightforward, but it is suggested that the listed names be used as guides to compound type, as there were often (both here and in semivolatiles, below) comparable matches from more than one database entry.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. The sample runs generally went well. A reextraction of sample 1045-069-04 by liquid/liquid extraction was performed due to some low base/neutral surrogate recoveries. The reextraction could only be concentrated to 5.0 ml methylene chloride compared to the normally achievable 1.0 ml due to higher boiling fractions in the sample. Both sets of data were reported for comparison. The TIC analysis showed a number of unusual compounds, many with poor spectral matches against the EPA NIST database. The spectra for many unknowns appeared to be of "O" containing alkanes; of particular note was that many spectra strongly suggested "crown" compounds, although the specific structure and type were uncertain. There were no other problems seen in final data review.